McLean County Roadway Infrastructure Prioritization Study

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Funded by the **Illinois** soybean checkoff.

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Executive Summary

Benefit-cost ratios were calculated for twenty McLean County infrastructure projects. The projects fall into three categories: resurfacing projects, reconstruction projects, and bridge projects. The twenty projects may need funded in the upcoming years, and McLean County desires to establish an unbiased methodology for allocating limited funds. The numerical benefit-cost ratios accounted for:

- Improvements in public safety,
- Limiting effects of adverse travel,
- Initial capital costs,
- Life cycle costs, and
- Salvage value associated with a 50 year life cycle.

In addition to the quantitative factors, qualitative information was gathered through stakeholder interviews and coordination with the McLean County Highway Department. Available funding was a consideration when prioritizing projects.

The recommendations are as follows:

- Resurfacing Cropsey Road with oil and chip is more economical that maintaining hot-mix asphalt (HMA) pavement since the traffic volumes do not require the increased structural capacity of the HMA pavement.

- The most beneficial bridges to the network are Lexington East Road Bridge, Gillum Road Bridge, Shirley Road Bridge, and Ron Smith Bridge. These bridges should be a top priority for the county if they are ever in danger of closing.

- None of the bridges have existing crash problems, therefore, replacing them while they still have usable life would not have any financial benefit to McLean County.

- The poor pavement on Meadows Road should only be reconstructed if it doesn't defer any other roadway projects.

- Danvers-Yuton Road and Horse Farm Road should both be high priorities for McLean County.

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Introduction

The mission of any county highway department is to create and maintain a safe and efficient network of roads and bridges. However, funding for projects is limited, and county officials have determined that it is necessary to identify the most beneficial and efficient ways to invest available funds. By determining the benefit-cost ratio for infrastructure projects based on stakeholder involvement, safety, adverse travel analyses, initial costs, and life cycle costs, improvements for McLean County can be prioritized.

A challenge for McLean County is balancing the demands of constituents and available funding between rural and urban projects. Rural projects generally serve fewer people, but cost less and closures result in longer detours. Urban projects serve more people, but they can cost over ten times the amount of a rural project. Thus, an unbiased approach to evaluate rural and urban projects objectively was developed.

Different funding resources are available for urban, rural, roadway, and bridge projects. The projects were ranked based on these funding opportunities. For example, if the County receives bridge funds, this report identifies which bridge would provide the most benefit for the cost.

This study also creates a repeatable process for McLean County. The proposed methodologies can prioritize possible projects in the future. Using quantitative and qualitative factors, jurisdictions can confidently defend funding choices to constituents.

Types of Projects

All twenty projects fall into one of three categories: resurfacing project, reconstruction project, or bridge project.

Resurfacing Projects

Five out of the six resurfacing projects will involve milling off the top layer of the existing Hot-Mix Asphalt (HMA) pavement and replacing it with new HMA pavement. The pavement structure will be designed to carry 80,000 pound vehicles. The sixth project is the Cropsey Road (CH1) project which will look at chip sealing the existing HMA pavement.

Reconstruction Projects

The reconstruction projects will involve rebuilding chip sealed roadways with an HMA surface. The roadways will be rebuilt to the Illinois Department of Transportation (IDOT) Bureau of Local Roads (BLR) standards, which may involve widening the roadway surface and/or the shoulders.

Bridge Projects

The bridge projects will rebuild the bridges to IDOT BLR standards and will be designed to carry 80,000 pound vehicles. These projects may result in more efficient truck routes through the county.

Methodology

The goal of the roadway infrastructure prioritization is to compare many different projects to one another objectively. Big, expensive, urban projects can sometimes overshadow smaller, rural projects. By dividing the benefit by the cost, the smaller projects have a chance to be recognized as valuable. Using a benefit-cost ratio allows the County to provide the most value to its constituents. To determine the benefit-cost ratio, the benefit of improved safety and prevented adverse travel is compared to the

cost of the proposed improvement. To compare the projects, the following data was collected and analyzed:

- Stakeholder needs and opinions
- Benefits
    - safety improvements
    - preventing adverse travel
- Costs
    - investment cost over the life cycle
    - salvage value

Stakeholder Interviews

Quantitative methods for determining priority may not show the local knowledge or importance of a transportation facility to the local user. To understand the qualitative importance of routes, four stakeholder interviews were conducted and a public meeting will be held. The stakeholder interviews intended to cover a diverse cross section of the constituency that relies on the County highway system daily. The groups interviewed included:

- A school district (Unit 5)
- Danvers Community Fire Protection District
- State Farm Insurance
- McLean County Farm Bureau and local elevators

Unit 5 School District

Unit 5 School District was consulted because it serves both urban students in the Town of Normal and rural students in the surrounding areas. A meeting was held on March 20th with Mark Daniel, PhD., the Superintendent, Joseph Adelman, the Director of Operations, and Marty Hickman, the Business Director.

Unit 5 contracts with consultants for the busing services, but the district officials were able to provide input on specific locations that cause concern for some of the driver, parents, and employees.

Comments from the meeting included:

- Unit 5 uses rural roadway networks to get to Lake Bloomington, Hudson, Carlock, Towanda, Crestwick, and Fox Creek
- A Highway on the west side of town that runs north and south would help buses avoid congestion and could provide a more direct route.
- The biggest obstacle for bus operations is traffic through the urban core during the morning peak hour, especially after 7:15 AM.
- Pepper Ridge Elementary and Fox Creek Elementary are the most isolated schools for the district with only a few route options. A critical bridge for each school would be the Fox Creek Road Bridge over the UP railroad tracks. This bridge is owned by the City of Bloomington, not McLean County.
- Weather can sometimes cause issues reaching Benjamin Elementary School.

- Northtown Road is critical for operations and current condition of the roadway affects the reliability of the bus system.
- The Eastside Highway project would benefit Unit 5.
- Ireland Grove Road, east of Towanda-Barnes Road is critical for reaching Benjamin Elementary School. The roadway has drainage and capacity issues. The road is owned by the City of Bloomington, not McLean County.

The school district would prefer that the County focus efforts and funding on maintaining the existing system opposed to system expansion.

Emergency Dispatch

McLean County Emergency Telephone Systems Board

A questionnaire completed by Lisa Martin from the McLean County Emergency Telephone Systems Board (ETSB).

ETSB identified the following roads as critical to emergency response:

- CH 29 – Towanda Barnes
- CH 21 – Lexington-Leroy Blacktop
- CH 34 – The Bridge at Shirley/Rt. 66
- Old Colonial Rd. – Bloomington Twp. Fire response would be drastically hampered
- CH 5, 15 & 36 – EMS response would be delayed
- CH 53 – Danvers covers Carlock and this would delay response
- Ron Smith Memorial – only access to Lake properties
- Evergreen Lake Rd.– only access to Lake properties
- Colfax-Weston Blacktop – Law enforcement response would be delayed

ETSB identified the following roads or bridges as locations where improvements could reduce response time:

- RR Underpass on Stringtown Rd.,
- Bridge in Shirley/Route 66 – capacity, and
- Add additional access to anywhere where there is only one access.

For the projects listed, the priority for ETSB would be the RR underpass, the Route 66 Bridge in Shirley, and then more access to single access communities. All of these improvements would result in faster response time and increased safety for the responders.

ETSB would prefer that the existing infrastructure be maintained and improved before new roads are built.

Danvers Community Fire Protection District

A questionnaire was completed by Glenn Rosecrans, Chief of the Danvers Community Fire Protection District.

Comments received included:

- County Highway 18 is the main east – west road used by Danvers Fire and Ambulance.

- Other than State Route 9, CH 18, Yuton Blacktop is the most used and important road within our district. There is no other east-west road between the Village and Bloomington Normal.
- CH 53 was recently improved and it was an excellent improvement which decreased the response times to Carlock.
- CH 55 is in poor shape; however we don't use it often. Instead we use CH 53 and then cut across to the west.
- The railroad crossing of CH 18 at the Yuton Elevator near White Oak Road is a major obstacle for operations, especially ambulances trying to cross the railroad. This is the biggest roadway problem, within the Danvers Fire and Rescue District

The fire and rescue district would prefer that the County focus efforts and funding on maintaining the existing system opposed to expanding the system.

Randolph Township Fire Department

A questionnaire was completed by Dennis Powell, Chief of the Randolph Township Fire Protection District.

Comments received included:

- 700 North Road from US 51 to Towanda-Barnes Road would cause significant adverse travel if it was unpassable.

The fire and rescue district would prefer that the County focus on maintaining existing roads in good driving order and that new bridges be replaced on an as needed system.

McLean County Sheriff's Department

A questionnaire was completed by Lieutenant Mike Kline, Patrol Commander of the McLean County Sheriff's Department.

Comments from the Sheriff's Department included:

- Route 51 between Oakland Avenue and Olive Street is critical to operations
- The East Side Bypass would improve response times east and west, but this is a low priority for the Sheriff's Department.

The Sheriff's Department would prefer that the County focus efforts and funding on maintaining the existing system opposed to expanding the system.

State Farm

State Farm Insurance is the largest employer in McLean County. The worldwide headquarters are located on the southeast side of Bloomington-Normal. Although the corporation is located entirely within Bloomington city limits, many of the employees live in the rural areas surrounding the urban core.

Comments from the meeting included:

- The plan is to keep the world headquarter's employee count fairly static.

- Approximately 400 employees use the van pool every day in order to consolidate the number of trips out to the rural areas of the County.
- Previously proposed roadway extensions for Hershey Road and Hamilton Road would benefit State Farm Employees. These discussed projects would be within the City of Bloomington jurisdiction, not McLean County.
- Adding a southbound right –turn lane at the intersection of Ireland Grove Road and Towanda-Barnes Road would decrease congestion for State Farm employees. This improvement has been slotted for construction in 2016.
- Airport Road, North of Raab Road, causes delay for State Farm employees. Widening this would increase access to rural communities to the north. This section of Airport Road is under the jurisdiction of the Town of Normal and Towanda Township, not McLean County
- Over 100 employees bike to work during the summer months of the year. Connecting the Constitution Trail to State Farm Park, possibly with the Hamilton Road extension project, could even increase these numbers.
- Making Linden Street more bicycle friendly would increase bicycle traffic from the communities north of the urban area into Bloomington-Normal.

State Farm would prefer that the County focus efforts and funding on maintaining the existing system opposed to expanding the system.

McLean County Farm Bureau and Local Elevator Operators

Outside of the Bloomington-Normal urban core, McLean County consists of mostly agricultural land use. On April 1, 2015, members from the McLean County Farm Bureau, Township Road Commissioners, and local elevator operators were interviewed to understand the effects the county infrastructure has on farming operations in the area. The attendees included:

- Fred Grieder – McLean County Farm Bureau and White Oak Township Road Commissioner
- Jeff Wilson – Prairie Central Elevator
- Tim Killian – Chenoa Township Road Commissioner
- Mark Heil – Prairie Central Elevators
- Rodney Landau – Anchor Township Road Commissioner
- Enid Schlipt – McLean County Farm Bureau
- Dean Buhrke – Empire Township Road Commissioner
- Scott Sigman – Illinois Soybean Association
- Anna Ziegler – McLean County Farm Bureau
- Mark Hines – McLean County Farm Bureau
- Eric Schmitt – McLean County highway Department
- Jerry Stokes – McLean County Highway Department

The farmers and elevators were asked specifics about their operations as well as questions about the McLean County highway system. In general, answers relating to specific organization operations were as expected.

Due to higher yields per acre, farmers are producing more, and the trend is expected to continue. This is leading to more trips between each farm and either the elevator or purchaser. Most of the farmers

are not currently expecting to purchase more acres or trucks, but they will still be producing more product. Farmers are using semi-trailers instead of tractors and wagons due to the added efficiency. Some of the semi-trailers were certified for 80,000 pounds, while others could still only hold 73,280 pounds. The elevators will continue to expand capacity and invest in new infrastructure to meet the higher yield demands.

Comments about the McLean County infrastructure include:

- Route 165 needs repaired
- Route 9, past Colfax, is in poor condition
- Some of the farmers felt like bridge construction always begins during harvest season, which can be frustrating when trying to move product. The McLean County Highway Department officials explained that a lot of times, the construction season is limited by available funding schedules and environmental factors.
- In general, the wider the roadway, the more comfortable it is for farmers.
- The Towanda-Barnes Road I-74 overpass is too narrow for both a car and wide farm equipment, and it is difficult to see if an opposing vehicle is coming.

All the interviewed farmers and elevators would prefer that the County focus efforts and funding on maintaining the existing system opposed to expanding the system.

Public Meeting

On July 22, 2015, a public meeting was held to discuss the prioritization project and results with interested members of the McLean County public. Notice for the meeting was published in the Pantagraph newspaper on July 6th and July 13th. Eric Schmitt and Jerry Stokes, McLean County Highway Department, were available to answer questions or address concerns. Scott Sigman from the Illinois Soybean Association and Kurt Bialobreski and Becca Wagner from Hanson were available to answer questions regarding the purpose and results of the prioritization study.

Attendees at the public meeting included:

- Glen Lodwig
- Joesph Wissmiller
- Tim Killian
- Jim Soeldner
- Jeffery Emmert

Conversation revolved around purpose, methodology, and specific projects in the County. Mr. Emmert, the Hudson Township Road Commissioner, identified a township road project that he would like completed. The current project was focused on county highways, but potential advantages and concerns regarding the project were discussed. A comment period was open until August 4th, 2015. No comments were received. The certificate of publication, the sign in sheet, provided handout, and comment sheet can be reviewed in Appendix D.

Benefit of Safety Improvements

To compare the relative safety of an existing transportation facility with the proposed improvement(s), the Highway Safety Manual (HSM) procedures were used. The HSM was developed by the American Association of State Highway and Transportation Officials (AASHTO) and most recently published in 2010. When considering property damage, lost productive time, emergency response expenses, medical bills, and other associated costs, the HSM claims that in 2005, each fatal or injury crash costs society $158,200 and each property-damage-only crash costs society $7,400. To account for two percent annual inflation from 2005 to 2014, crash cost values of $189,063.64 and $8,843.69 were used for fatal/injury crashes and property-damage-only crashes, respectively. The benefit of a specific project corresponded to the cost of the crashes prevented by the improvements. Additional information regarding this methodology can be found in Appendix A.

Benefit of Preventing Adverse Travel

When a road or bridge is closed, adverse travel is experienced by the user, and there are costs associated with the added distance and time it takes to detour around the closed roadway network segment. However, it is unfair to claim the benefit of keeping a road open in 2014, if the road is expected to stay open without improvements until 2024. Therefore, the benefit of preventing adverse travel for a roadway was not claimed until the existing pavement condition is projected to fail, and the benefit-cost ratio represents the value of replacing a roadway in the year the pavement will fail. For a bridge, pavement condition is not the limiting factor and there is no industry standard for expected failure based on sufficiency ratings. So, the failure date for bridges was assumed to be 2014 and the benefit-cost ratio represents the value of replacing a bridge right before it must be closed. Both the shortest detour route for passenger vehicles using any public route and heavy vehicles which must stay on truck routes was determined. Then the ADT for both users were multiplied by the increased distance if the roadway was no longer available. The costs associated with adverse travel include:

- $15 per hour for passenger vehicle time
- $50 per hour for truck time
- $0.565 per mile
- 0.000025 tons of Volatile Organic Compound (VOC) pollutants per hour at $1,813 per ton
- 0.000005 tons of Nitrogen Oxide (NOx) pollutants per hour at $7,147 per ton

Values for passenger vehicle time, truck time, VOC pollutants, and NOx pollutants are the values recommended for use in the US Department of Transportation (USDOT) TIGER Grant Program, and the mileage value is the current AAA reimbursement rate. Additional information regarding this methodology can be found in Appendix B.

Exclusions in the Benefit-Cost Ratio Analysis

A benefit of certain projects that was excluded is the ability to generate additional property tax revenue by developing land that is currently assessed at lower rates. If access is improved and attracts developers to build sites along a roadway, the property tax revenue collected by the County could increase with the change in assessed evaluation from agricultural uses to commercial, residential, or industrial uses. This may have a direct effect on the County budget and was purposefully excluded for multiple reasons:

- The mission of the County Highway Department is not to attract developers; instead, its purpose is to provide a safe and efficient transportation system.

- The goal of the project was to determine which improvements benefit users most. While the increase in property tax would help the County's bottom line, it would not necessarily help the individual roadway network user.
- The benefit of property tax would significantly outweigh any other benefit metric; thus moving specific projects to the top of the list without guaranteed revenue.
- No data was readily available to compare and recognize the benefits that rural projects would have on County revenues.

Specific roadways were also excluded from the analysis. Some roadways are indisputably important to the roadway network and must be maintained. For McLean County, this includes Towanda-Barnes Road.

Projects

McLean County identified 20 infrastructure projects that are expected to require improvements in the next 20 years. The project list includes fourteen roadway segments and six bridges.

The total anticipated budget to complete all 20 of the projects is $54 million in 2015. However, McLean County's current budget and funding opportunities will not accommodate the immediate completion of all of the projects. The purpose of the benefit-cost ratio analyses is to assist the County with prioritizing the most important projects. Figure 1 shows the general location of the 20 proposed improvements.

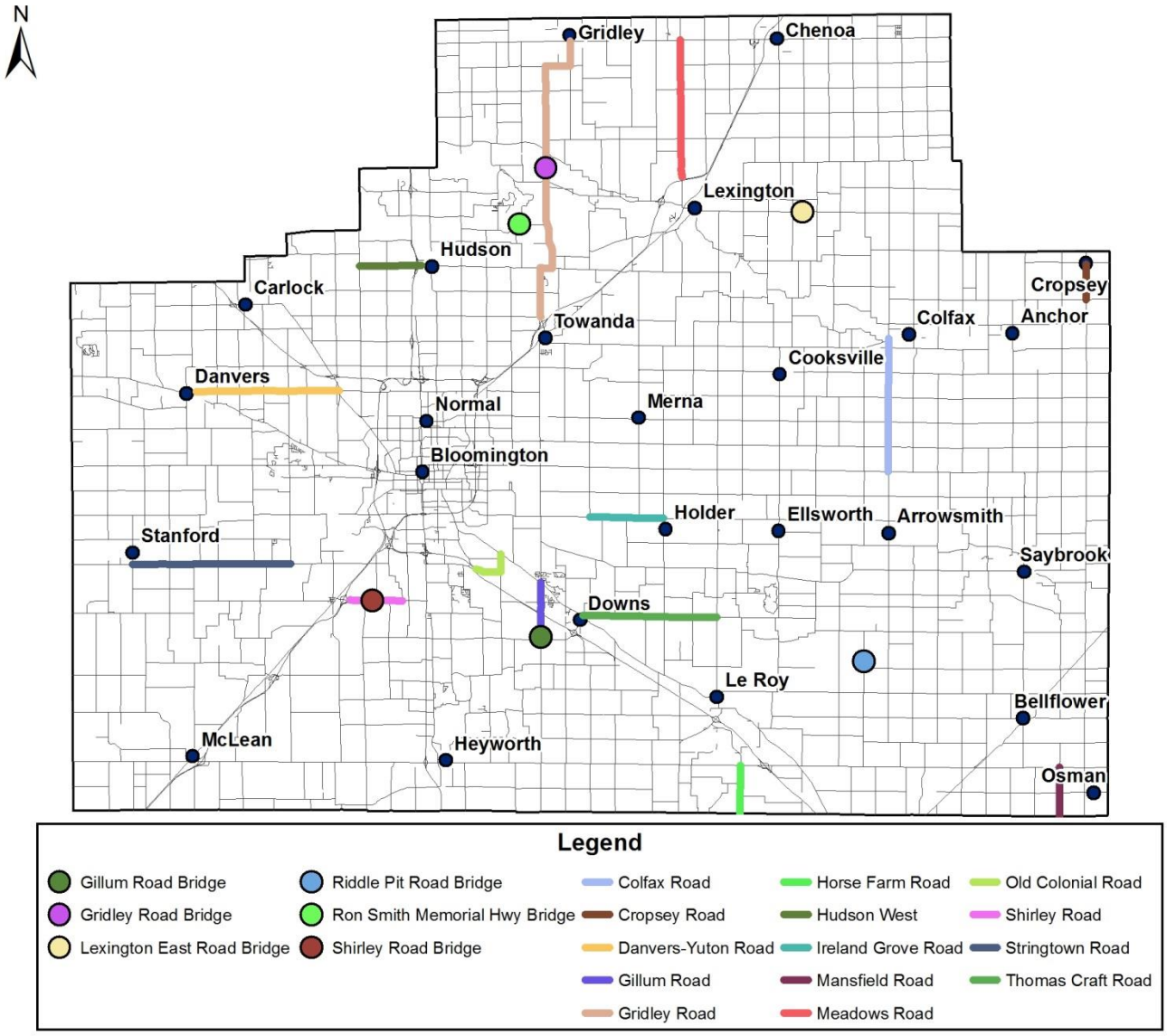

Figure 1. Map of County Roadway Infrastructure Improvements

Table 1 provides the opinion of probable cost for each project in the prioritization study, as provided by the McLean County Highway Department. A detailed description of how costs equated into a life cycle cost can be found in Appendix C.

Table 1. Project Costs

Project	County Highway Number	Proposed Improvement	Opinion of Probable Costs
Colfax Road	CH 15	Resurfacing with HMA	$1,475,000
Cropsey Road	CH 1	Resurfacing with Oil and Chip	$62,000
Danvers-Yuton Road	CH 18	Resurfacing with HMA	$1,850,000
Gillum Road	CH 29	Resurfacing with HMA	$1,100,000
Gillum Road Bridge	CH 29	Bridge Reconstruction	$1,100,000
Gridley Road Bridge	CH 29	Bridge Reconstruction	$5,000,000
Gridley Road	CH 29	Resurfacing with HMA	$4,350,000
Horse Farm Road	CH 21	Roadway Reconstruction	$2,500,000
Hudson West	CH 12	Roadway Reconstruction	$3,000,000
Ireland Grove Road	CH 28	Roadway Reconstruction	$4,500,000
Lexington East Road Bridge	CH 8	Bridge Reconstruction	$450,000
Mansfield Road	CH 3	Roadway Reconstruction	$2,500,000
Meadows Road	CH 23	Roadway Reconstruction	$8,250,000
Old Colonial Road	CH 30	Roadway Reconstruction	$2,400,000
Ridde Pit Road Bridge	CH 15	Bridge Reconstruction	$700,000
Ron Smith Bridge	CH 63	Bridge Reconstruction	$1,500,000
Shirley Road	CH 34	Roadway Reconstruction	$2,500,000
Shirley Road Bridge	CH 34	Bridge Reconstruction	$675,000
Stringtown Road	CH 32	Resurfacing with HMA	$2,200,000
Thomas Craft Road	CH 36	Roadway Reconstruction	$7,875,000

Colfax Road

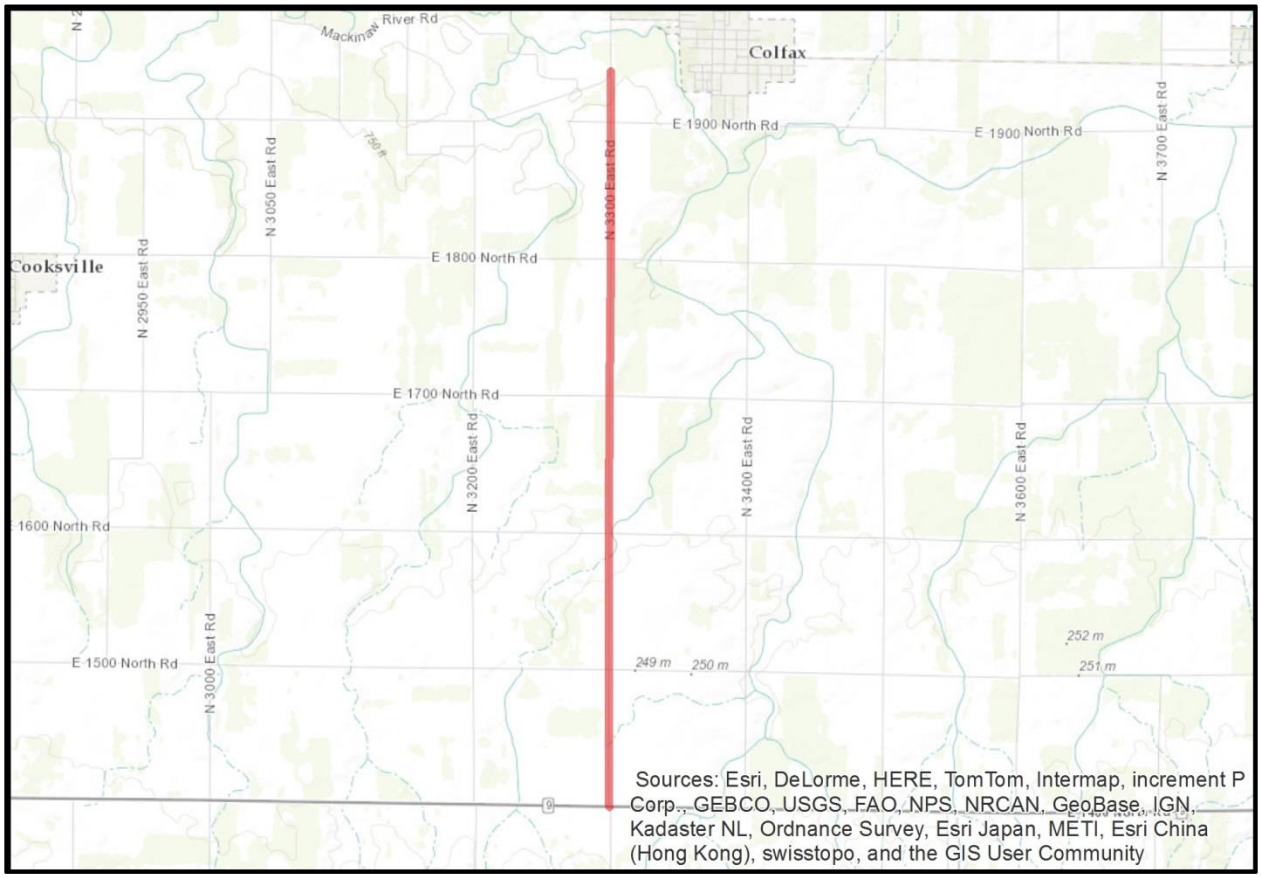

Figure 2. Colfax Road Location

Existing Conditions

This project is generally located west and southwest of Colfax in east-central McLean County. Colfax Road (County Highway 15, or CH 15), from IL Route 9 to IL Route 165, is classified as a rural major collector roadway. It consists of a hot-mix asphalt (HMA) surface with two 11-foot travel lanes, 4-foot gravel shoulders, and carries 733 vehicles per day. No roadway lighting is present within the project limits. The intersection with IL Route 9 is free flow for the east-west movements and stop controlled for the southbound movement. The intersection with IL Route 165 is free flow for the east-west movements and stop controlled for the northbound movement.

Scope of Improvements

The Colfax Road project is anticipated to consist of resurfacing with HMA. The purpose of the project is to increase the allowable load to 80,000 pounds. The improvement will not widen the roadway or the shoulders. The 5.4 mile long project would be expected to cost approximately $1,475,000 in 2016 construction dollars

Stakeholder Consideration

Colfax Road was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Colfax Road has a benefit-cost ratio of 14.1 if rebuilt in 2024.

Safety

Because the purpose of this improvement is to increase the structural capabilities of the road, the improvements will not have a significant effect on the expected crash frequency. The fatal and injury crash rate is expected to remain at 0.55 crashes per year and the property damage only (PDO) crash rate is expected to remain at 1.17 crashes per year.

Adverse Travel

The closure of Colfax Road results in an annual increase of 554,400 miles and 10,080 hours, the closed road would cost society approximately $836,000 annually and $54,221,000 over the 50 year life cycle.

Cropsey Road

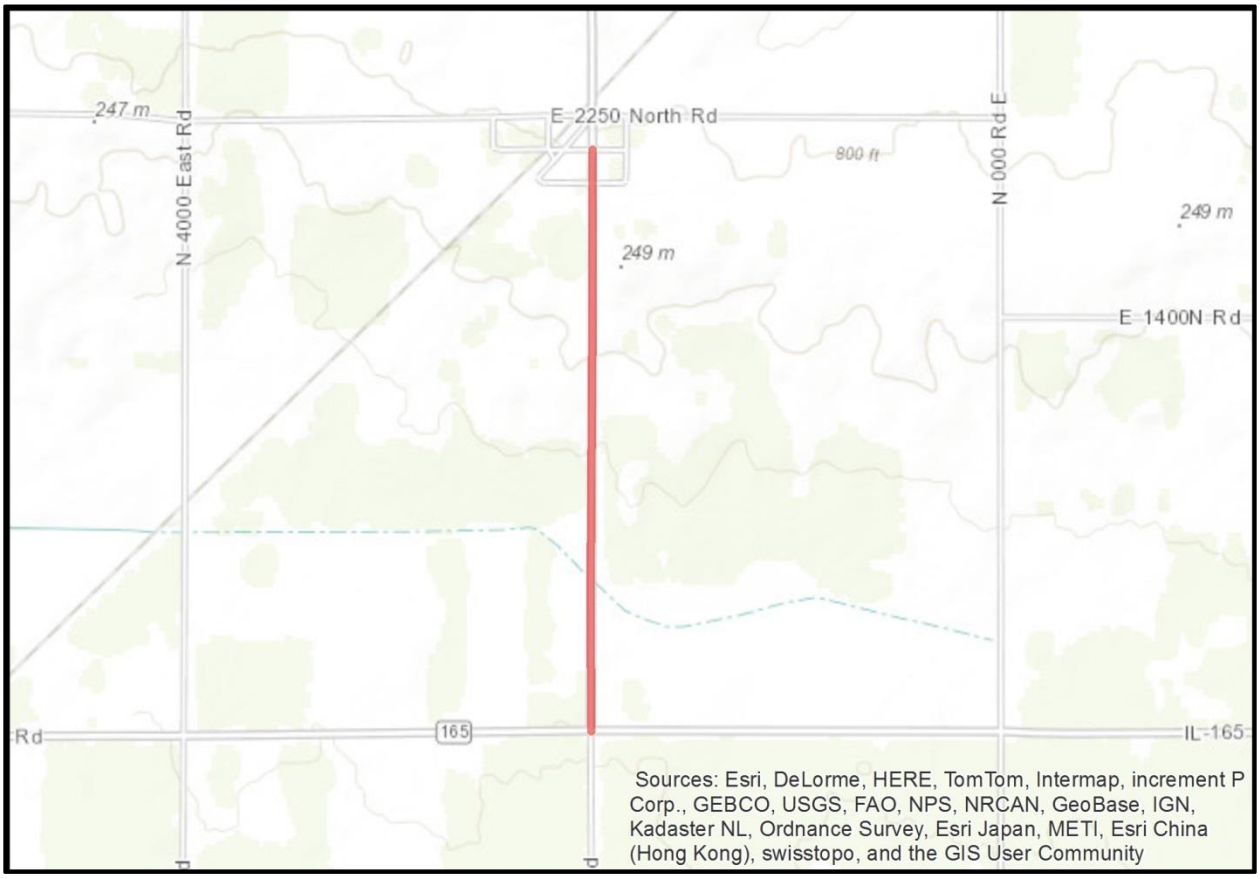

Figure 3. Cropsey Road Location

Existing Conditions

This project extends southward from Cropsey in northeast McLean County. Cropsey Road (CH 1), from IL Route 165 to Cropsey, is classified as a rural major collector roadway. It consists of a HMA surface with two 11-foot travel lanes, 4-foot gravel shoulders, and carries 350 vehicles per day. No roadway lighting is present within the project limits. The intersection with IL Route 165 is free flow for the east-west movements and stop controlled for the north-south movements. Several stop-controlled intersections are present along this section of Cropsey Road.

Scope of Improvements

The Cropsey Road project is anticipated to consist of converting the HMA pavement to oil and chip surface. The purpose of this project would be to maintain an adequate driving surface while reducing the county's long term maintenance expenses. The improvement will not widen the roadway or the shoulders. The 1.5 mile long project would be expected to cost around $62,000 in 2016 construction dollars.

Stakeholder Consideration

Cropsey Road was not specifically mentioned in any stakeholder interviews.

Benefit-Cost Ratio

Cropsey Road has a benefit-cost ratio of 69.5 if resurfaced in 2026

Safety

Because the purpose of this improvement is reduce the long term maintenance for McLean County by resurfacing the roadway using a less expensive procedure, the improvements will not have a significant effect on the expected crash frequency. The fatal and injury crash rate is expected to remain at 0.13 crashes per year and the property damage only (PDO) crash rate is expected to remain at 0.25 crashes per year.

Adverse Travel

The closure of Cropsey Road results in an annual increase of 554,400 miles and 10,080 hours, the closed road would cost society approximately $461,000 annually and $27,872,000 over the 50 year life cycle.

Danvers-Yuton Road

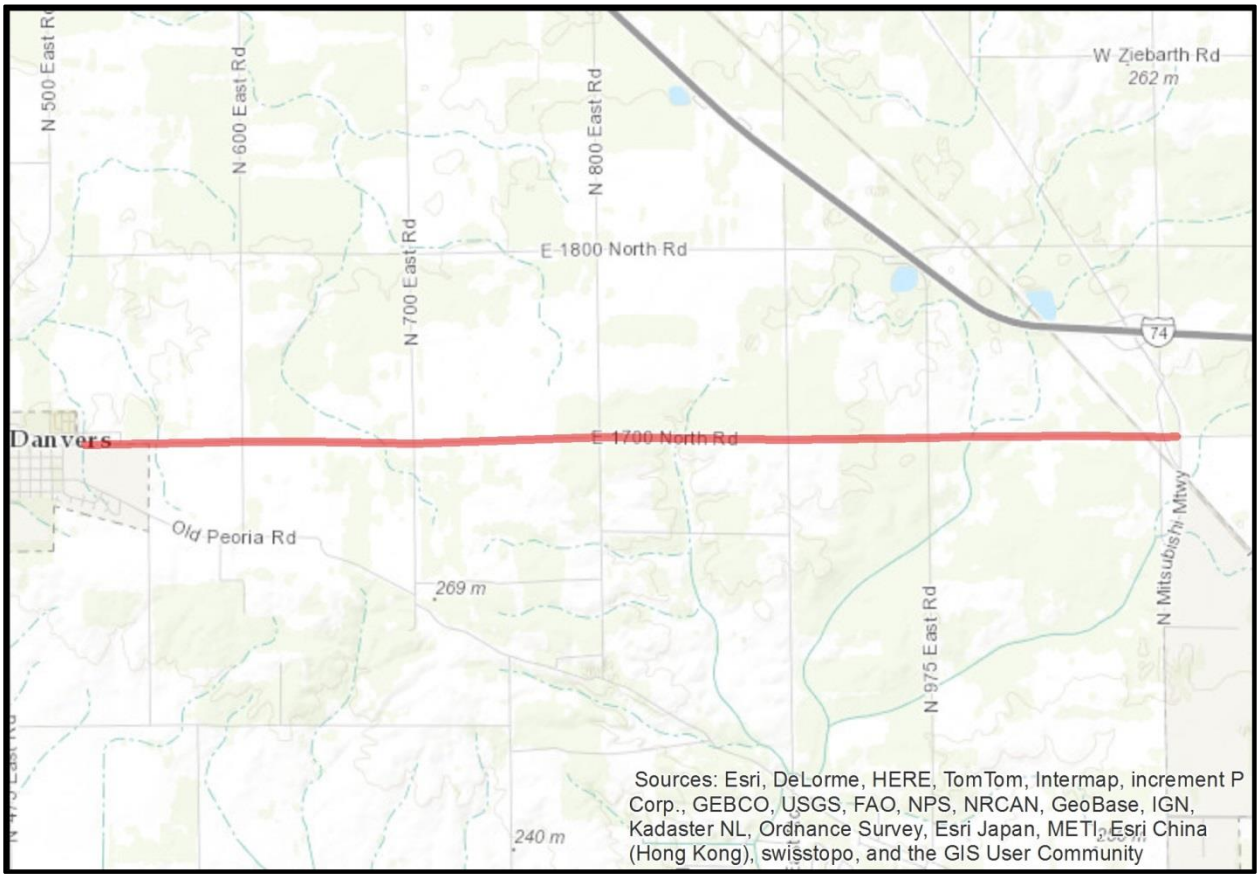

Figure 4. Danvers-Yuton Road Location

Existing Conditions

This project generally traverses from Danvers to Yuton in west-central McLean County. Danvers-Yuton Road (CH 18), from CH 53 to US 150, is classified as a rural major collector roadway. It consists of HMA surface with two 12-foot travel lanes, 4-foot gravel shoulders, and carries 2,900 vehicles per day. No roadway lighting is present within the project limits, except at the intersection with CH 53. The intersection with CH 53 is four-way stop-controlled, and the intersection with US 150 is signalized. Several stop-controlled intersections are present within Danvers.

Scope of Improvements

The Danvers-Yuton Road project is anticipated to consist of resurfacing with HMA. The purpose of the project is to increase the allowable load to 80,000 pounds. The improvement will not widen the roadway or the shoulders. The 6.2 mile long project would be expected to cost around $1,850,000 in 2016 construction dollars.

Stakeholder Consideration

Danvers-Yuton Road was mentioned by the fire chief from the Village of Danvers.

Benefit-Cost Ratio

Danvers-Yuton Road has a benefit-cost ratio of 35.7 if rebuilt in 2029.

Safety

Because the purpose of this improvement is to increase the structural capabilities of the road, the improvements will not have a significant effect on the expected crash frequency. The fatal and injury crash rate is expected to remain at 3.03 crashes per year and the property damage only (PDO) crash rate is expected to remain at 6.38 crashes per year.

Adverse Travel

The closure of Danvers-Yuton Road in an annual increase of 1,910,000 miles and 34,730 hours, the closed road would cost society approximately $2,617,000 annually and $141,405,000 over the 50 year life cycle.

Gillum Road

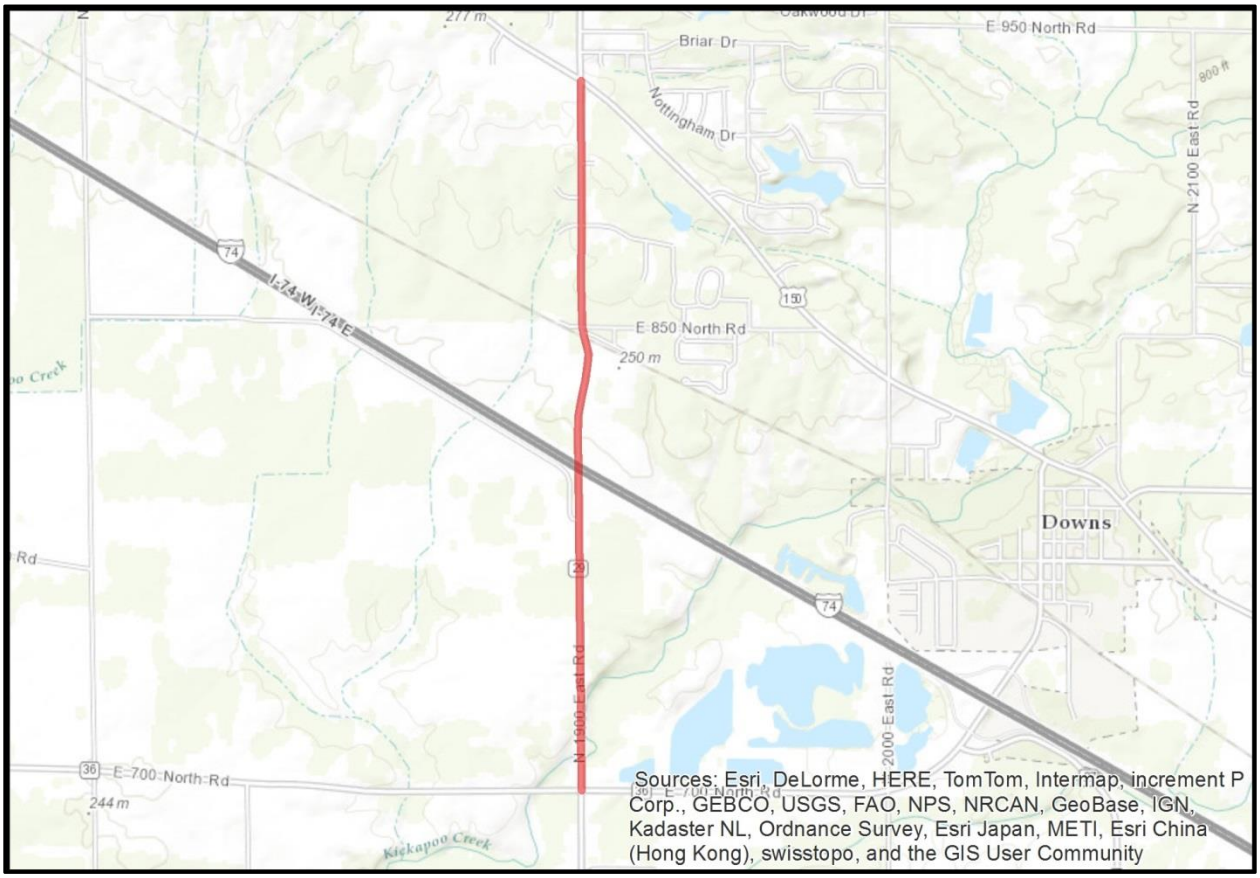

Figure 5. Gillum Road Location

Existing Conditions

This project is generally located southeast of Bloomington in south-central McLean County. Gillum Road (CH 29), from CH 36 to US 150, is classified as an urban minor arterial. It consists of a HMA surface with two 11-foot travel lanes, 4-foot gravel shoulders, and carries 1,375 vehicles per day. No roadway lighting is present within the project limits, except at the intersection with US 150. The intersection with CH 36 is four-way stop-controlled, and the intersection with US 150 is signalized.

Scope of Improvements

The Gillum Road project is anticipated to consist of resurfacing with HMA, The purpose of the project is to increase the allowable load to 80,000 pounds. The improvement will not widen the roadway or the shoulders. The 2.8 mile long project would be expected to cost around $1,100,000 in 2016 construction dollars.

Stakeholder Consideration

Gillum Road was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Gillum Road has a benefit-cost ratio of 27.4 if rebuilt in 2026.

Safety

Because the purpose of this improvement is to increase the structural capabilities of the road, the improvements will not have a significant effect on the expected crash frequency. The fatal and injury crash rate is expected to remain at 1.99 crashes per year and the property damage only (PDO) crash rate is expected to remain at 4.35 crashes per year.

Adverse Travel

The closure of Gillum Road in an annual increase of 989,400 miles and 17,990 hours, the closed road would cost society $1,004,800 annually and $60,695,000 over the 50 year life cycle.

Gillum Road Bridge (Baker Bridge)

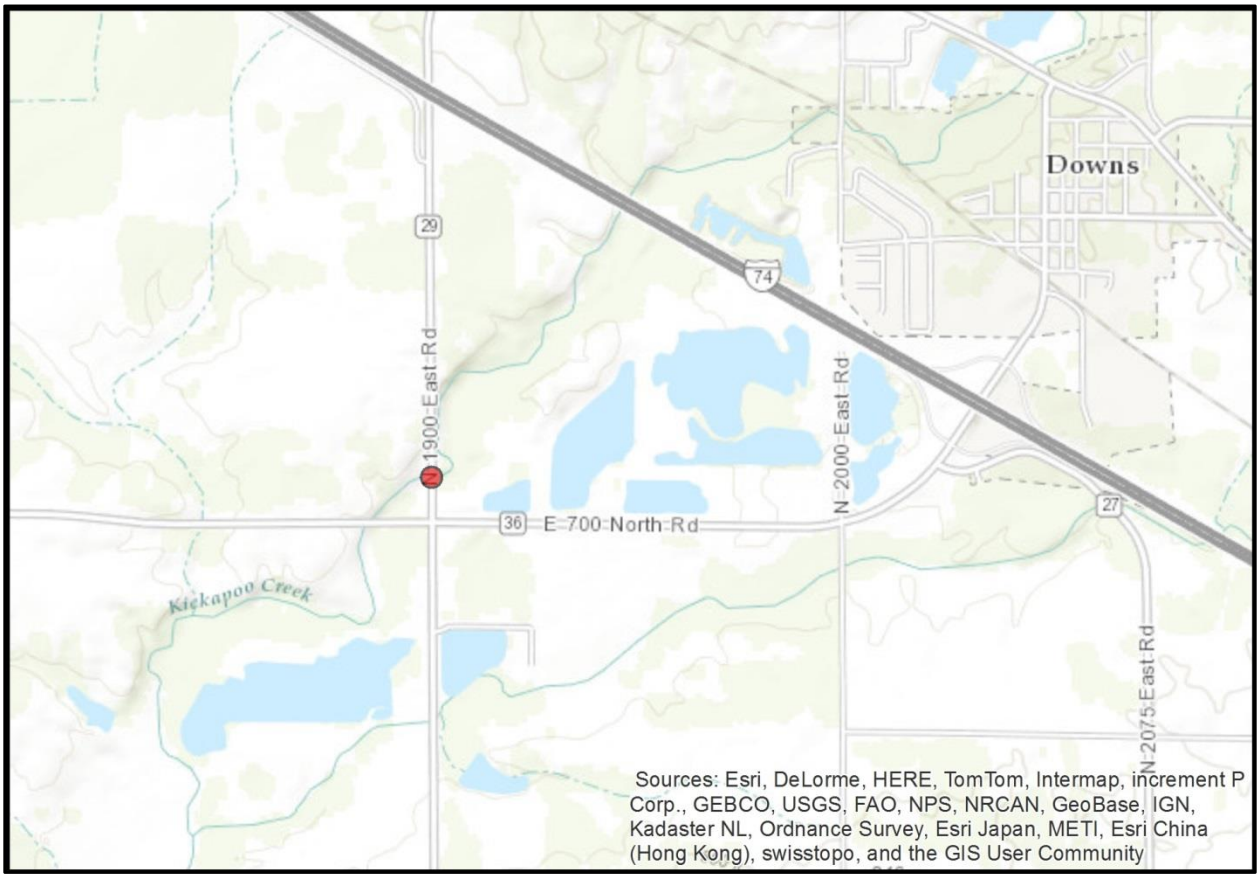

Figure 6. Gillum Road Bridge Location

Existing Conditions

Gillum Road Bridge (also known as Baker Bridge) is a three-span, concrete slab bridge built in 1958, located about two miles southwest of Downs in south-central McLean County. The bridge crosses Kickapoo Creek and carries Gillum Road (CH 29) within the Gillum Road project limits described above. The roadway surface is constructed of HMA, with two 11-foot lanes and 4-foot gravel shoulders, and it carries 1,400 vehicles per day. The bridge is about 105 feet long and has a relatively low sufficiency rating.

Scope of Improvements

The Gillum Road Bridge project is anticipated to consist of a complete replacement. The project is currently part of the McLean County Highway Department 5-Year Plan (2015-2019), and is programmed for FY 2017. The bridge is expected to cost approximately $1,100,000.

Stakeholder Involvement

Gillum Road Bridge was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Gillum Road Bridge has a benefit-cost ratio of 118.0 if rebuilt in 2016.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.0032 to 0.0029 and the annual expected property damage crash frequency decreasing from 0.0068 to 0.0061. This equates to a societal savings of $11.74 annually and $1,800 over the life cycle.

Adverse Travel

The closure of Gillum Road Bridge in an annual increase of 1,006,700 miles and 18,300 hours, the closed road would cost society approximately $1,020,000 annually and $86,380,000 over the 50 year life cycle.

Gridley Road

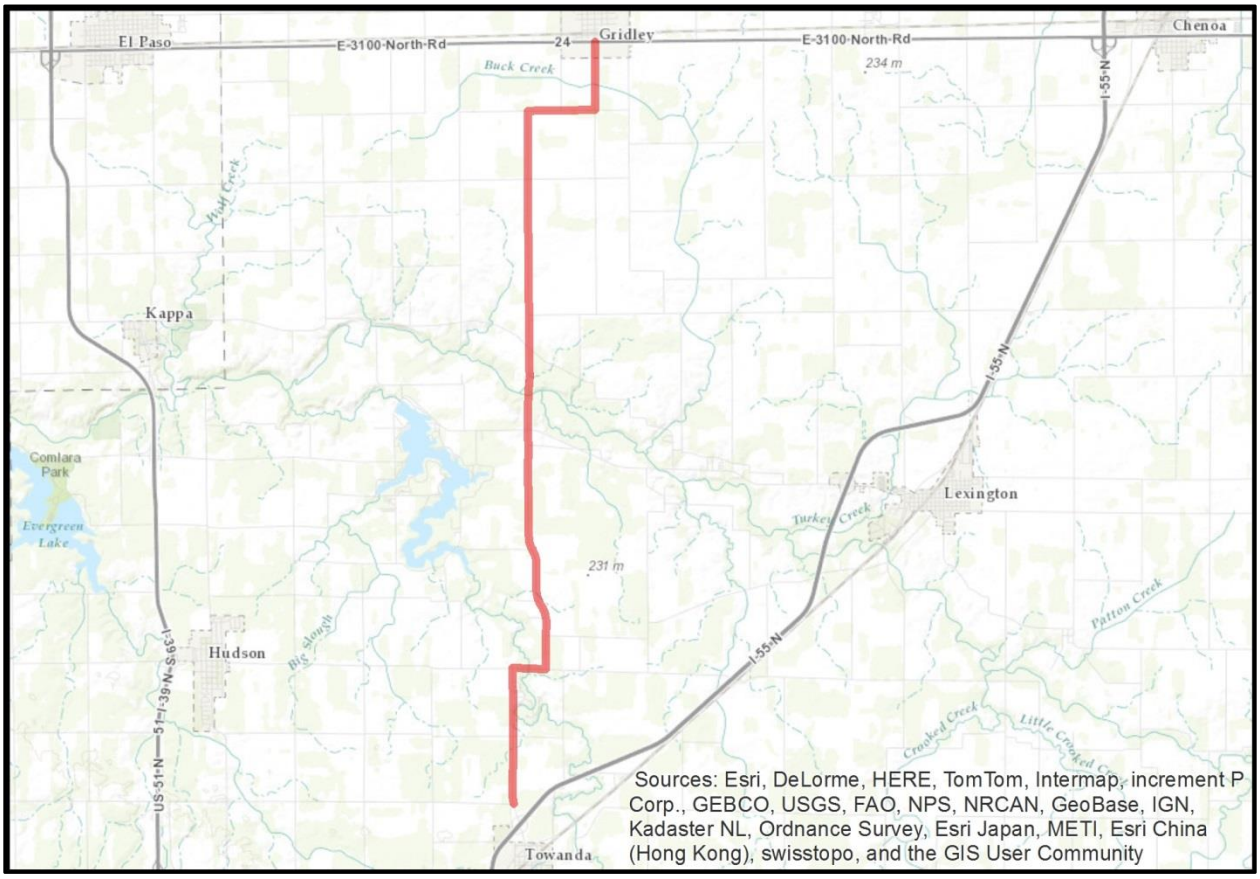

Figure 7. Gridley Road Location

Existing Conditions

This project generally extends northward from Towanda to Gridley in north-central McLean County. Gridley Road (CH 29), from just north of I-55 to US 24, is classified as a rural major collector. It consists of a HMA surface with two 12-foot travel lanes for 1.5 miles, 11-foot lanes for 10 miles, 4-foot gravel shoulders, and carries 1,100 to 2,300 vehicles per day. No roadway lighting is present within the project limits. Although primarily oriented in the north-south direction, Gridley Road briefly traverses east-west twice within the project limits. The intersection with US 24 is free flow for the east-west movements and stop-controlled for the north-south movements.

Scope of Improvements

The Gridley Road project is anticipated to consist of resurfacing with HMA. The purpose of the project is to increase the allowable load to 80,000 pounds. The improvement will not widen the roadway or the shoulders. The 11.5 mile long project would be expected to cost around $4.35 million in 2016 construction dollars

Stakeholder Consideration

Gridley Road was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Gridley Road has a benefit-cost ratio of 26.0 if rebuilt in 2024.

Safety

Because the purpose of this improvement is to increase the structural capabilities of the road, the improvements will not have a significant effect on the expected crash frequency. The fatal and injury crash rate is expected to remain at 3.81 crashes per year and the property damage only (PDO) crash rate is expected to remain at 7.88 crashes per year.

Adverse Travel

The closure of Gridley Road is an annual increase of 3,739,000 miles and 44,400 hours, the closed road would cost society $3,655,000 annually and $237,099,000 over the 50 year life cycle.

Gridley Road Bridge (Fifer Bridge)

Figure 8. Gridley Road Bridge Location

Existing Conditions

Gridley Road Bridge (also known as Fifer Bridge) is a five-span, steel beam bridge built in 1956, located about six miles south of Gridley in north-central McLean County. The bridge crosses the Mackinaw River and carries Gridley Road (CH 29) within the Gridley Road project limits described previously. The roadway surface is constructed of HMA, with two 11-foot lanes and 4-foot gravel shoulders, and it carries 1,650 vehicles per day. The bridge is about 385 feet long and has a low sufficiency rating.

Scope of Improvements

The Gridley Road Bridge project is anticipated to consist of a full replacement. Repairs to the bridge are currently in the McLean County Highway Department 5-Year Plan (2015-2019), but the inevitable full reconstruction is not. The project would be expected to cost around $5 million in 2016 construction dollars.

Stakeholder Involvement

Gridley Road Bridge was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Gridley Road Bridge has a benefit-cost ratio of 98.0 if rebuilt in 2016.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.060 to 0.036 and the annual expected property damage crash frequency decreasing from 0.126 to 0.075. This equates to a societal savings of $4,980 annually and $760,700 over the life cycle.

Adverse Travel

The closure of Gridley Road Bridge results in an annual increase of 3,071,000 miles and 55,800 hours, the closed road would cost society approximately $3,857,700 annually and $326,622,000, over the 50 year life cycle.

Horse Farm Road

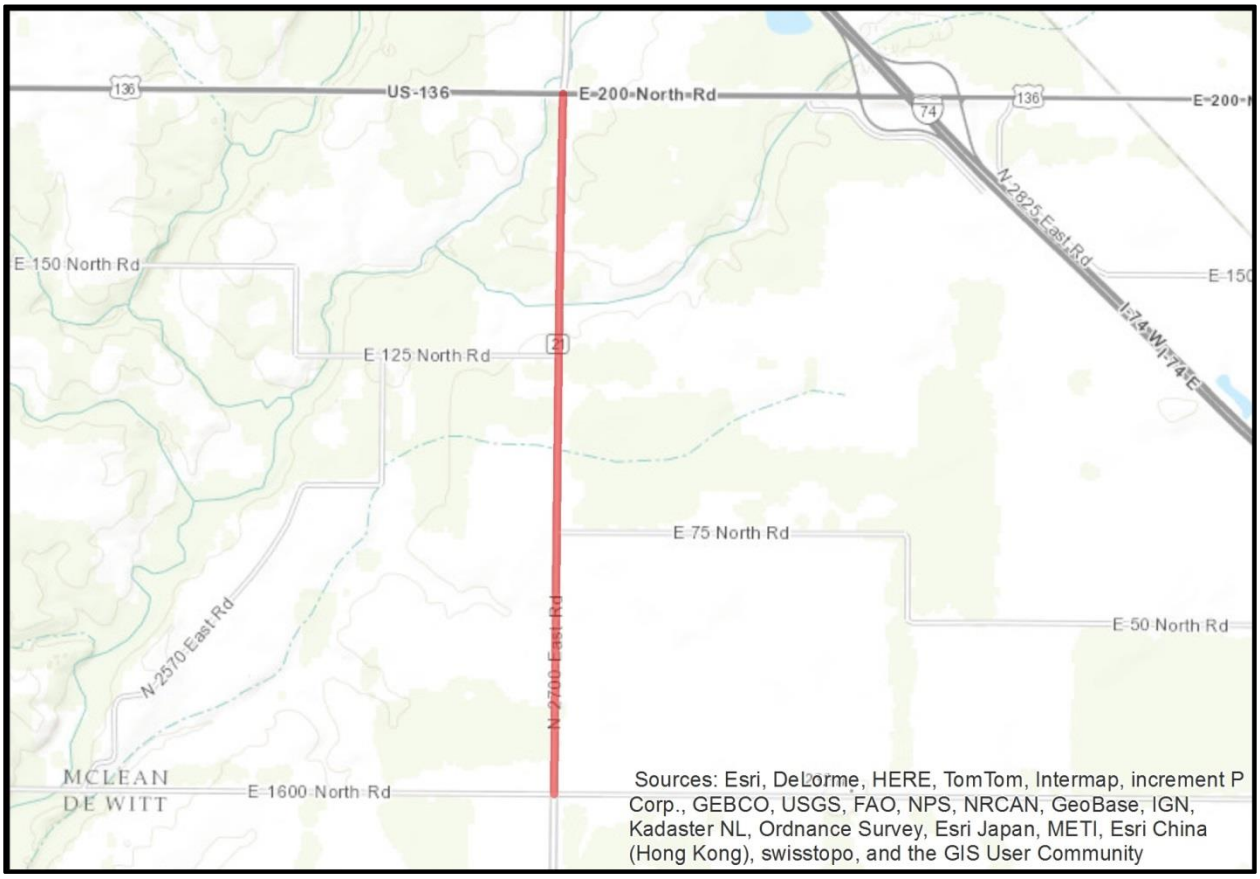

Figure 9. Horse Farm Road Location

Existing Conditions

This project is generally located three miles south of Le Roy in south-central McLean County. Horse Farm Road (CH 21), from the McLean/DeWitt County Line to US 136, is classified as a rural major collector. It consists of oil and chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 950 vehicles per day. No roadway lighting is present within the project limits. The intersection at the county line is free flow for the north-south movements and stop-controlled for the east-west movements. The intersection with US 136 is free flow for the east-west movements and stop-controlled for the north-south movements.

Scope of Improvements

The Horse Farm Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders. The 2.0 mile long project would be expected to cost around $2.5 million in 2016 construction dollars

Stakeholder Involvement

Horse Farm Road was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Horse Farm Road has a benefit-cost ratio of 34.7 if rebuilt in 2024.

Safety

Since the project is a complete reconstruction, the road will be built to the Illinois Department of Transportation (IDOT) Bureau of Local Roads (BLR) standards. For this project, the BLR Manual will require wider shoulders than the existing condition. These improvements will have an effect on safety.

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.32 to 0.29 and the annual expected property damage crash frequency decreasing from 0.63 to 0.57. This equates to a societal savings of $6,300 annually and $664,000 over the life cycle.

Adverse Travel

The closure of Horse Farm Road results in an annual increase of 1,469,000 miles and 28,000 hours, the closed road would cost society approximately $1,798,000 annually and $116,650,000 over the 50 year life cycle.

Hudson West

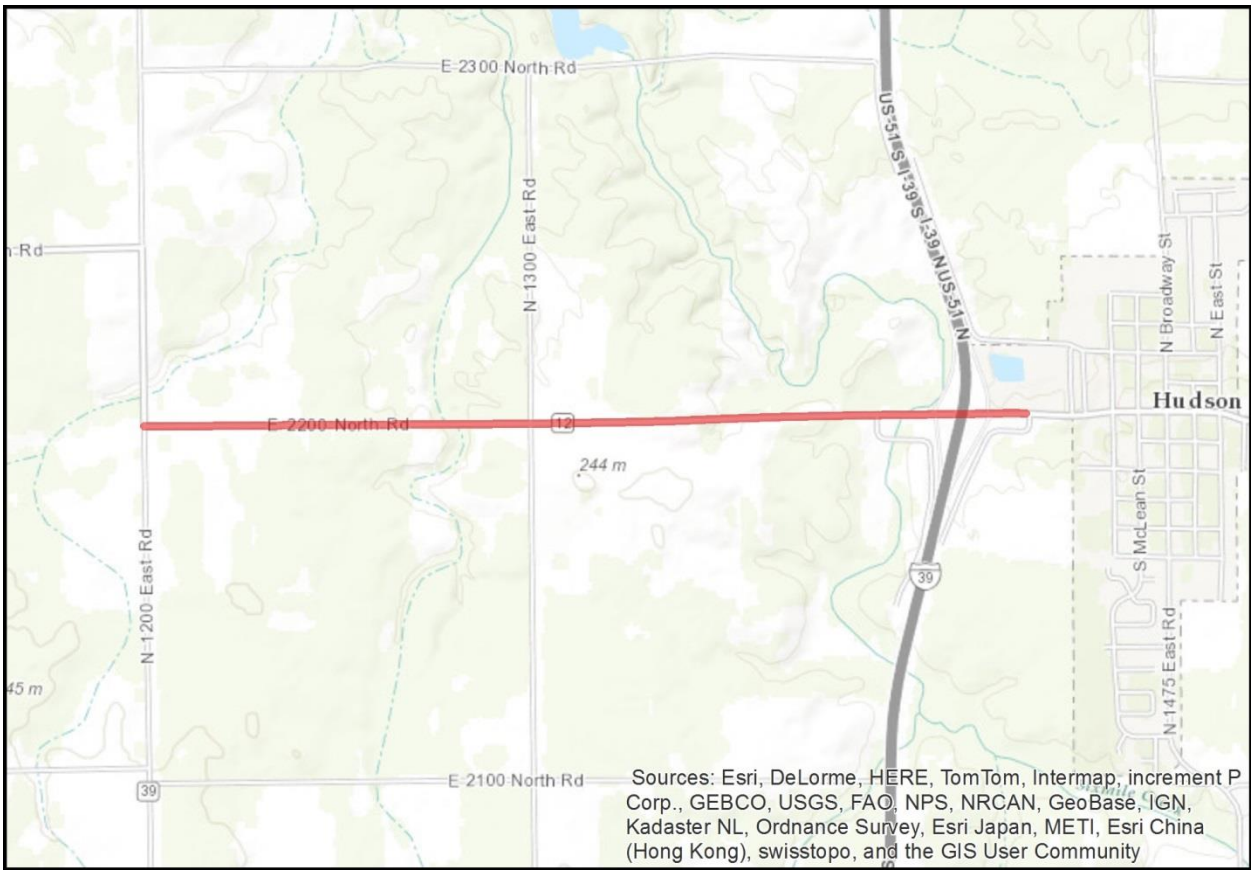

Figure 10. Hudson West Location

Existing Conditions

This project is generally located east of Hudson in north-west McLean County. Hudson West (CH 12), from the 1200 East Road to the west edge of Hudson, is classified as a rural major collector. It consists of oil and chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 800 vehicles per day. No roadway lighting is present within the project limits. The intersection at 1200 East Road is free flow for the north-south movements and stop-controlled for the westbound movement.

Scope of Improvements

The Hudson West project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders. The 2.0 mile long project would be expected to cost around $3.0 million in 2016 construction dollars.

Stakeholder Involvement

Hudson West was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Hudson West has a benefit-cost ratio of 26.3 if rebuilt in 2026.

Safety

Since the project is a complete reconstruction, the road will be built to the Illinois Department of Transportation (IDOT) Bureau of Local Roads (BLR) standards. For this project, the BLR Manual will require wider shoulders and flatter vertical alignment than the existing condition. These improvements will have an effect on safety.

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.369 to 0.293 and the annual expected property damage crash frequency decreasing from 0.780 to 0.618. This equates to a societal savings of $15,900 annually and $69,000 over the life cycle.

Adverse Travel

The closure of Hudson West results in an annual increase of 1,607,000 miles and 25,000 hours, the closed road would cost society $1,629,000 annually and $98,387,000 over the 50 year life cycle.

Ireland Grove Road

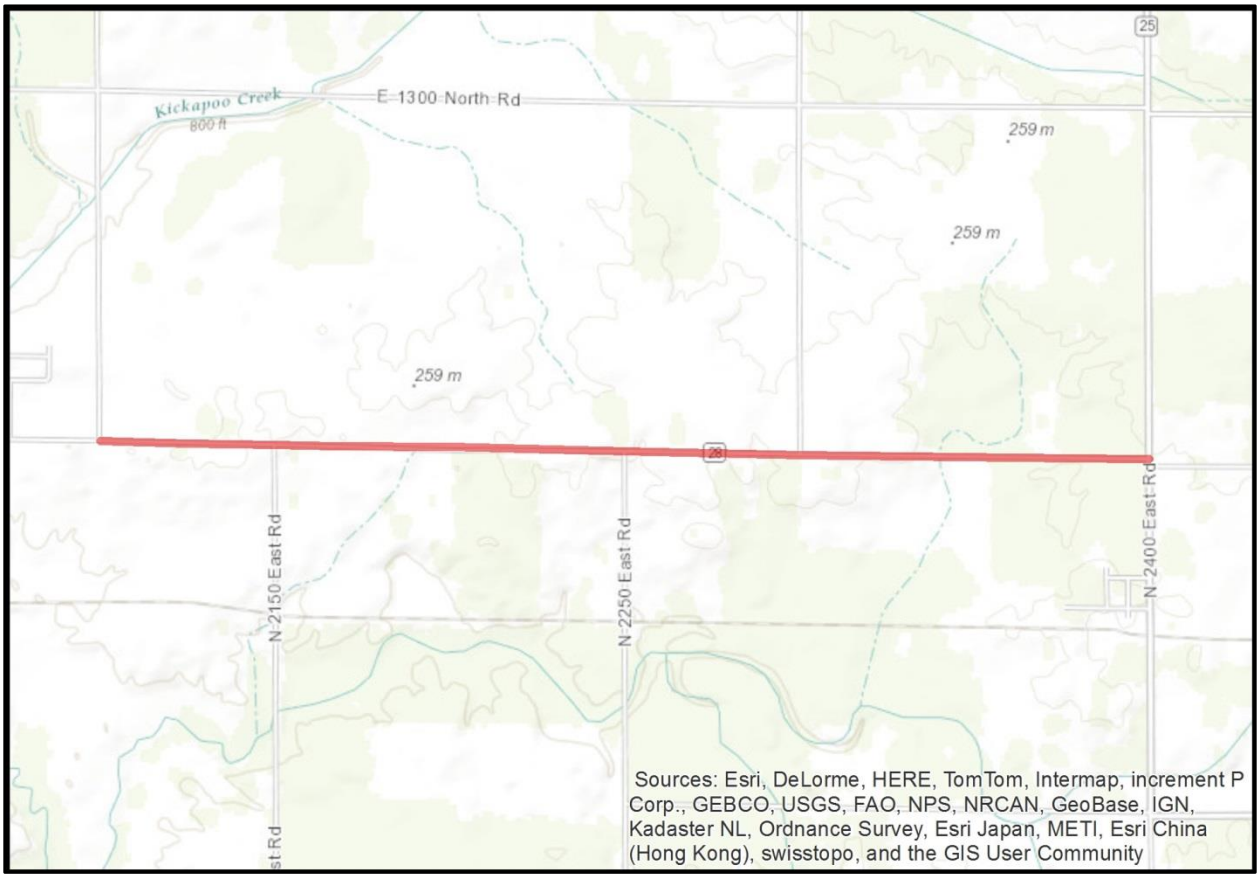

Figure 11. Ireland Grove Road Location

Existing Conditions

This project is generally located southeast of Bloomington in central McLean County. Ireland Grove Road (CH 28), from 2100 East Road to CH 25, is classified as a rural major collector. It consists of oil and chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 1000 vehicles per day. No roadway lighting is present within the project limits. The intersection at 2100 East Road is free flow for the east-west movements and stop-controlled for the southbound movement. The intersection with CH 25 is free flow for the north-south movements and stop-controlled for the eastbound movement.

Scope of Improvements

The Ireland Grove Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 12-foot travel lanes and 4-foot gravel shoulders. The 3.0 mile long project would be expected to cost around $4.5 million in 2016 construction dollars

Stakeholder Involvement

Ireland Grove Road was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Ireland Grove Road has a benefit-cost ratio of 11.7 if rebuilt in 2020.

Safety

Since the project is a complete reconstruction, the road will be built to the Illinois Department of Transportation (IDOT) Bureau of Local Roads (BLR) standards. For this project, the BLR Manual will require wider lanes and shoulders and flatter horizontal alignment than the existing condition. These improvements will have an effect on safety.

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.23 to 0.17 and the annual expected property damage crash frequency decreasing from 0.48 to 0.35. This equates to a societal savings of $12,900 annually and $1,641,00 over the life cycle.

Adverse Travel

The closure of Ireland Grove Road results in an annual increase of 782,000 miles and 14,900 hours, the closed road would cost society approximately $933,000 annually and $69,381,000 over the 50 year life cycle.

Lexington East Road Bridge (Lindsay Bridge)

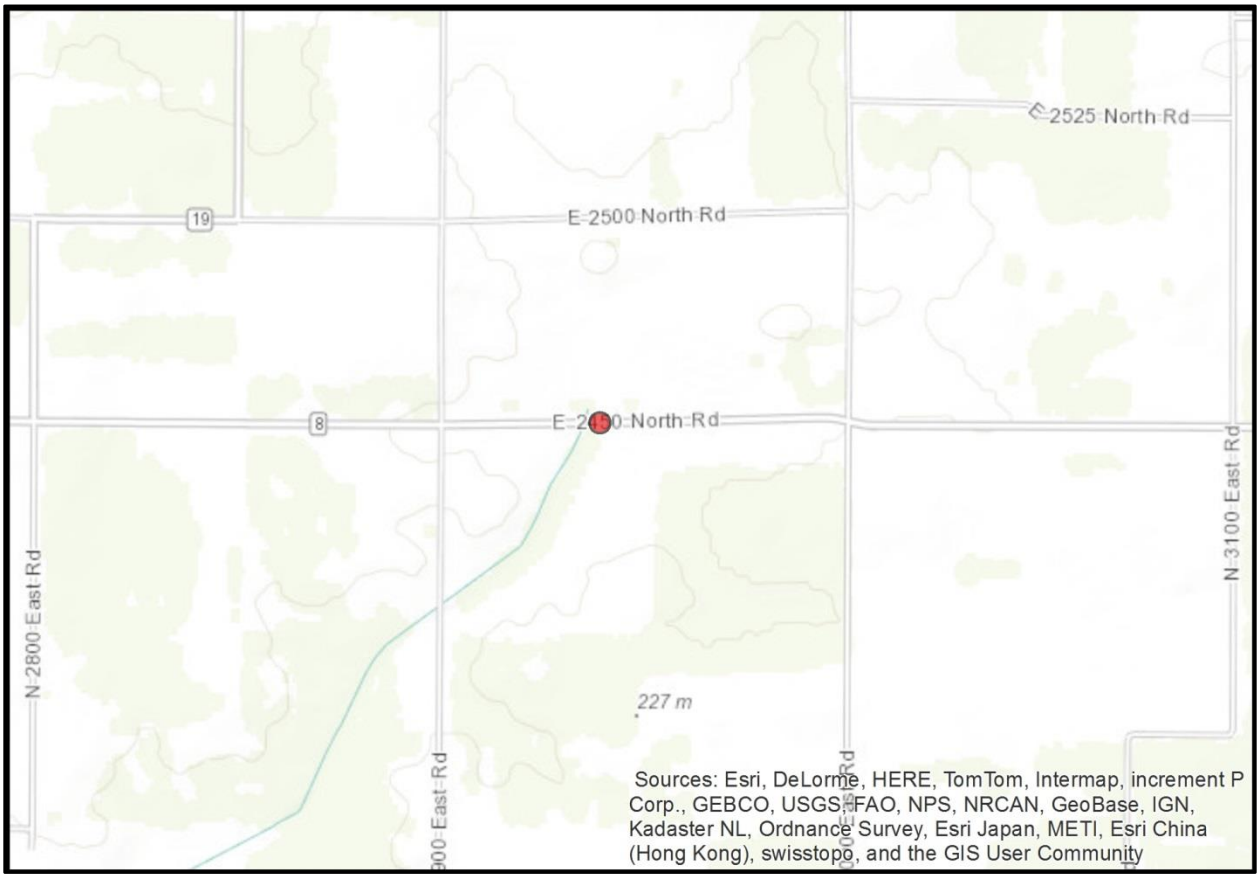

Figure 12. Lexington East Road Bridge Location

Existing Conditions

Lexington East Road Bridge (also known as Lindsay Bridge) is a single-span, concrete slab bridge built in 1933, located about four miles east of Lexington in northeast McLean County. The bridge crosses Pattons Creek and carries CH 8. The roadway surface is constructed of oil and chip, with two 10-foot lanes and 2-foot gravel shoulders, and it carries 300 vehicles per day. The bridge is about 35 feet long and has a low sufficiency rating.

Scope of Improvements

The Lexington East Road Bridge project is anticipated to consist of a complete replacement, and is currently included in the McLean County Highway Department 5-Year Plan (2015-2019), the project is programmed for FY 2016 with an expected cost of approximately $450,000.

Stakeholder Involvement

Lexington Road East Bridge was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Lexington Road East Bridge has a benefit-cost ratio of 122.76 if rebuilt in 2016.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.0004 to 0.0003 and the annual expected property damage crash frequency decreasing from 0.0009 to 0.0007. This equates to a societal savings of $18 annually and $2,800 over the life cycle.

Adverse Travel

The closure of Lexington Road East Bridge results in an annual increase of 186,000 miles and 3,600 hours, the closed road would cost society approximately $435,300 annually and $36,826,000 over the 50 year life cycle.

Mansfield Road

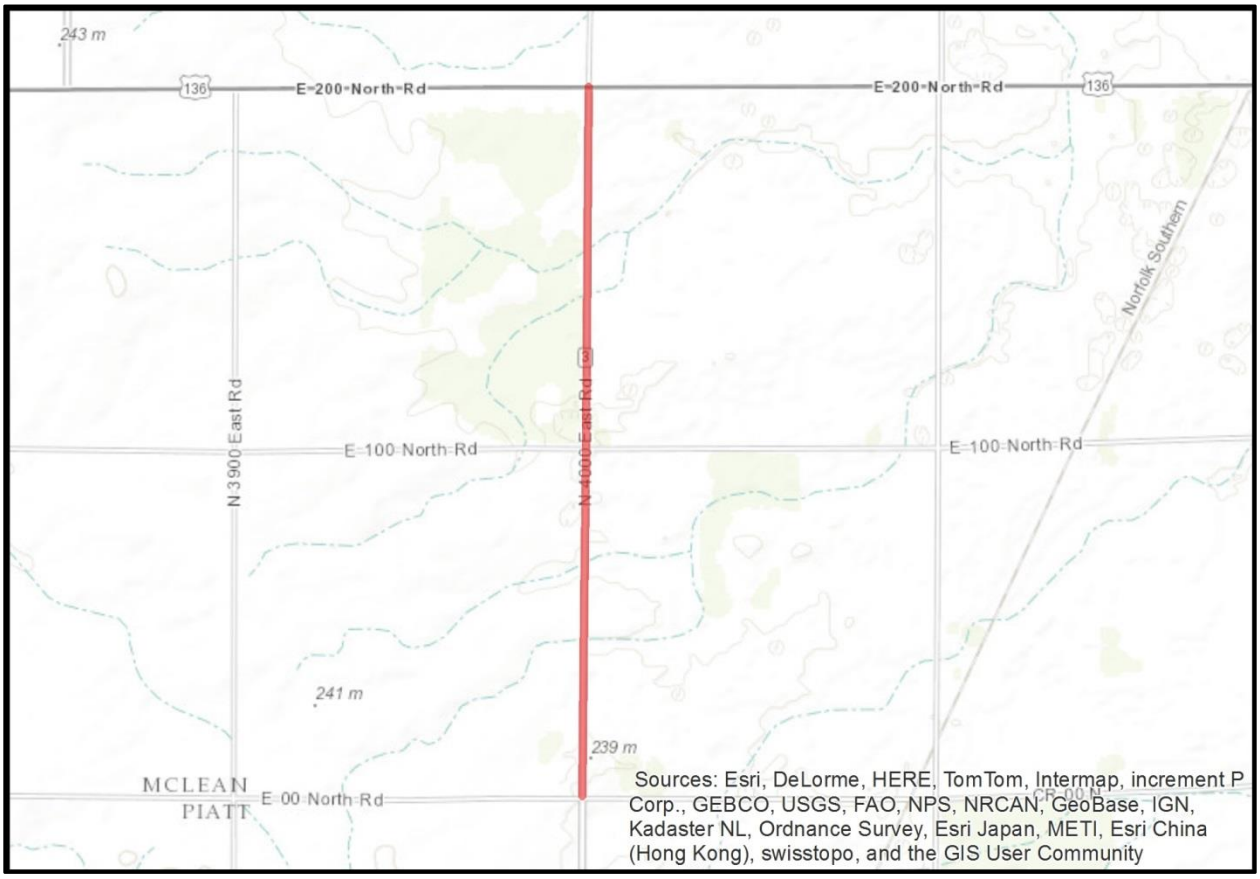

Figure 13. Mansfield Road Location

Existing Conditions

This project is generally located southeast of Bellflower in the southeast corner of McLean County. Mansfield Road (CH 3), from the McLean/Piatt County Line to US 136, is classified as a rural major collector. It consists of oil and chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 550 vehicles per day. No roadway lighting is present within the project limits. The intersection with US 136 is free flow for the east-west movements and stop-controlled for the north-south movements.

Scope of Improvements

The Mansfield Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders with a flatter vertical alignment. The 2.0 mile long project would be expected to cost around $2.5 million in 2016 construction dollars

Stakeholder Consideration

Mansfield Road was not mentioned specifically in any stakeholder involvement interviews.

Benefit-Cost Ratio

Mansfield Road has a benefit-cost ratio of 12.3 if rebuilt in 2020.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.24 to 0.18 and the annual expected property damage crash frequency decreasing from 0.46 to 0.35. This equates to a societal savings of $11,500 annually and $1,462,000 over the life cycle.

Adverse Travel

The closure of Mansfield Road results in an annual increase of 443,000 miles and 8,000 hours, the closed road would cost society approximately $568,000 annually and $42,209,000 over the 50 year life cycle.

Meadows Road

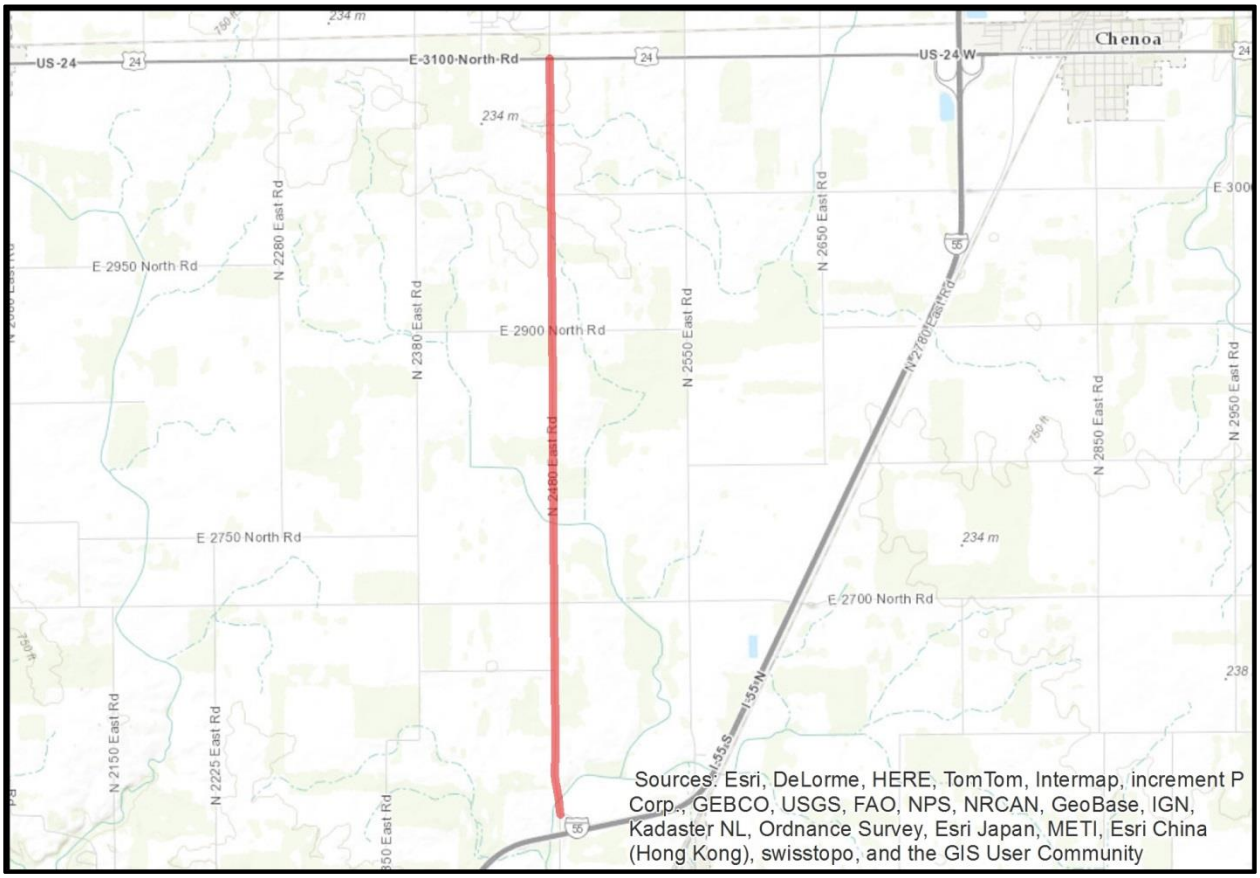

Figure 14. Meadows Road Location

Existing Conditions

This project is generally located north of Lexington in north-central McLean County. Meadows Road (CH 23), from just north of I-55 to US 24, is classified as a rural major collector. It consists of oil and chip surface with two 9.5-foot travel lanes, 2-foot gravel shoulders, and carries 467 vehicles per day. No roadway lighting is present within the project limits. The intersection with US 24 is free flow for the east-west movements and stop-controlled for the north-south movements.

Scope of Improvements

The Meadows Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders with a vertical flatter alignment. The 5.5 mile long project would be expected to cost around $8.25 million in 2016 construction dollars.

Stakeholder Consideration

Meadows Road was not mentioned specifically in any stakeholder involvement interviews.

Benefit-Cost Ratio

Meadows Road has a benefit-cost ratio of 4.1 if rebuilt in 2018.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.52 to 0.34 and the annual expected property damage crash frequency decreasing from 1.02 to 0.68. This equates to a societal savings of $36,000 annually and $5,009,000 over the life cycle.

Adverse Travel

The closure of Meadows Road results in an annual increase of 378,000 miles and 6,700 hours, the closed road would cost society approximately $520,000 annually and $41,245,000 over the 50 year life cycle.

Funded by the **Illinois** soybean checkoff.

Old Colonial Road

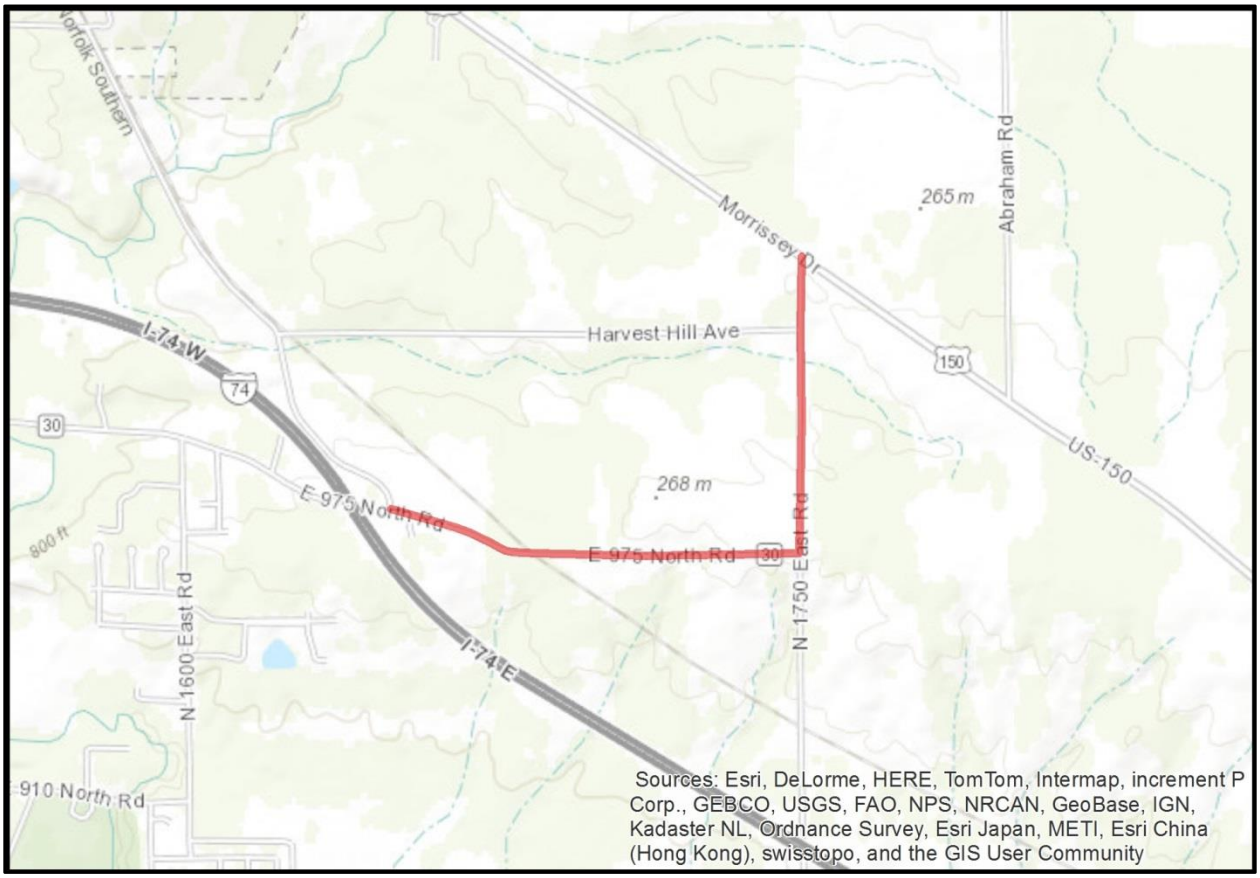

Figure 15. Old Colonial Road Location

Existing Conditions

This project is generally located just south of Bloomington in central McLean County. Old Colonial Road (CH 30), from Capodice Road (just east of I-74) to US 150, is classified as an urban collector. It consists of oil and chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 500 to 700 vehicles per day. No roadway lighting is present within the project limits. The intersection with Capodice Road is free flow for the east-west movements and stop-controlled for the southbound movement. The intersection where Old Colonial Road changes to a north-south orientation is stop-controlled for the eastbound movement and free flow for the north-south movements. The intersection with US 150 is stop-controlled for the northbound movement and free flow for the east-west movements.

Scope of Improvements

The Old Colonial Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders. The 1.6 mile long project would be expected to cost around $2.5 million in 2016 construction dollars.

Stakeholder Consideration

Old Colonial Road was mentioned by McLean County Emergency Telephone Systems Board as critical to Bloomington Township Fire District. The fire station is located on the west end of the road. This project would improve the east end of the roadway, which is probably not as critical to the fire district as the west of the road, but it could be the shortest route to emergencies that occur on the southeast portions of the district.

Benefit-Cost Ratio

Old Colonial Road has a benefit-cost ratio of 14.7 if rebuilt in 2020.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.31 to 0.28 and the annual expected property damage crash frequency decreasing from 0.65 to 0.59. This equates to a societal savings of $5,500 annually and $699,000 over the life cycle.

Adverse Travel

The closure of Old Colonial Road results in an annual increase of 560,000 miles and 12,700 hours, the closed road would cost society approximately $631,000 annually and $46,904,000 over the 50 year life cycle.

Riddle Pit Road Bridge (Salt Creek Bridge)

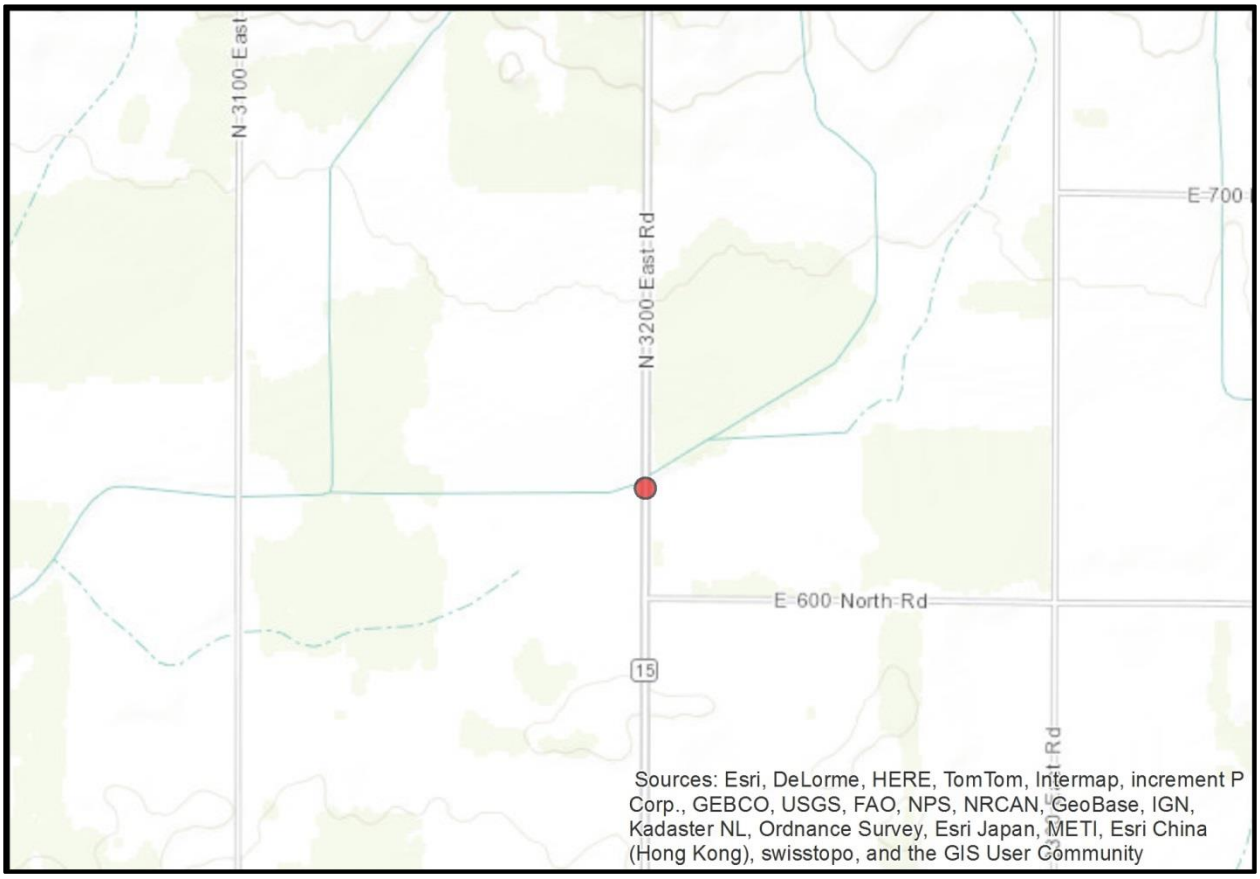

Figure 16. Riddle Pit Road Bridge Location

Existing Conditions

Riddle Pit Road Bridge (also known as Salt Creek Bridge) is a single-span, steel beam bridge built in 1932, located about six miles northeast of Le Roy in south-central McLean County. The bridge crosses the North Fork of Salt Creek and carries CH 15, which is classified as a rural major collector. The roadway surface is constructed of oil and chip, with two 10-foot lanes and 2-foot gravel shoulders, and it carries 150 vehicles per day. The bridge is about 40 feet long and has an average sufficiency rating.

Scope of Improvements

The Riddle Pit Road Bridge project is anticipated to consist of a complete replacement, and is currently part of the McLean County Highway Department 5-Year Plan (2015-2019). The project is programmed for FY 2018 with an expected cost of approximately $700,000.

Stakeholder Involvement

Riddle Pit Road Bridge was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Riddle Pit Road Bridge has a benefit-cost ratio of 24.3 if rebuilt in 2016.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.0002 to 0.0001 and the annual expected property damage crash frequency decreasing from 0.0005 to 0.0004. This equates to a societal savings of $12 annually and $1,800 over the life cycle.

Adverse Travel

The closure of Riddle Pit Road Bridge results in an annual increase of 32,200 miles and 700 hours, the closed road would cost society approximately $134,000 annually and $11,335,000 over the 50 year life cycle.

Ron Smith Memorial Highway Bridge (Money Creek Bridge)

Figure 17. Ron Smith Memorial Highway Bridge Location

Existing Conditions

Ron Smith Memorial Highway Bridge (also known as Money Creek Bridge) is a four-span, concrete beam bridge built in 1958, located near Lake Bloomington in north-central McLean County. The bridge crosses Money Creek and carries Ron Smith Memorial Highway (CH 63), which is classified as a rural minor collector. The roadway surface is constructed of HMA, with two 11-foot lanes and 4-foot gravel shoulders, and it carries 750 vehicles per day. The bridge is about 185 feet long and has a low-to-average sufficiency rating.

Scope of Improvements

The Ron Smith Memorial Highway Bridge project is anticipated to be a full replacement, but it is not currently programmed in the McLean County Highway Department 5-Year Plan (2015-2019). The project is expected to cost approximately $1,500,000.

Stakeholder Involvement

Ron Smith Memorial Roadway was mentioned by McLean County Emergency Telephone Systems Board as the sole access to the lake houses surrounding Lake Bloomington. While the bridge is not the sole access to the roadways which service the communities, its closure could result in adverse travel for emergency services.

Benefit-Cost Ratio

Ron Smith Memorial Highway Bridge has a benefit-cost ratio of 110.2 if rebuilt in 2016.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.0039 to 0.0035 and the annual expected property damage crash frequency decreasing from 0.0083 to 0.0074. This equates to a societal savings of $87 annually and $13,200 over the life cycle.

Adverse Travel

The closure of the Ron Smith Memorial Highway Bridge results in an annual increase of 1,460,000 miles and 27,400 hours, the closed road would cost society approximately $1,303,000 annually and $110,236,000 over the 50 year life cycle.

Shirley Road

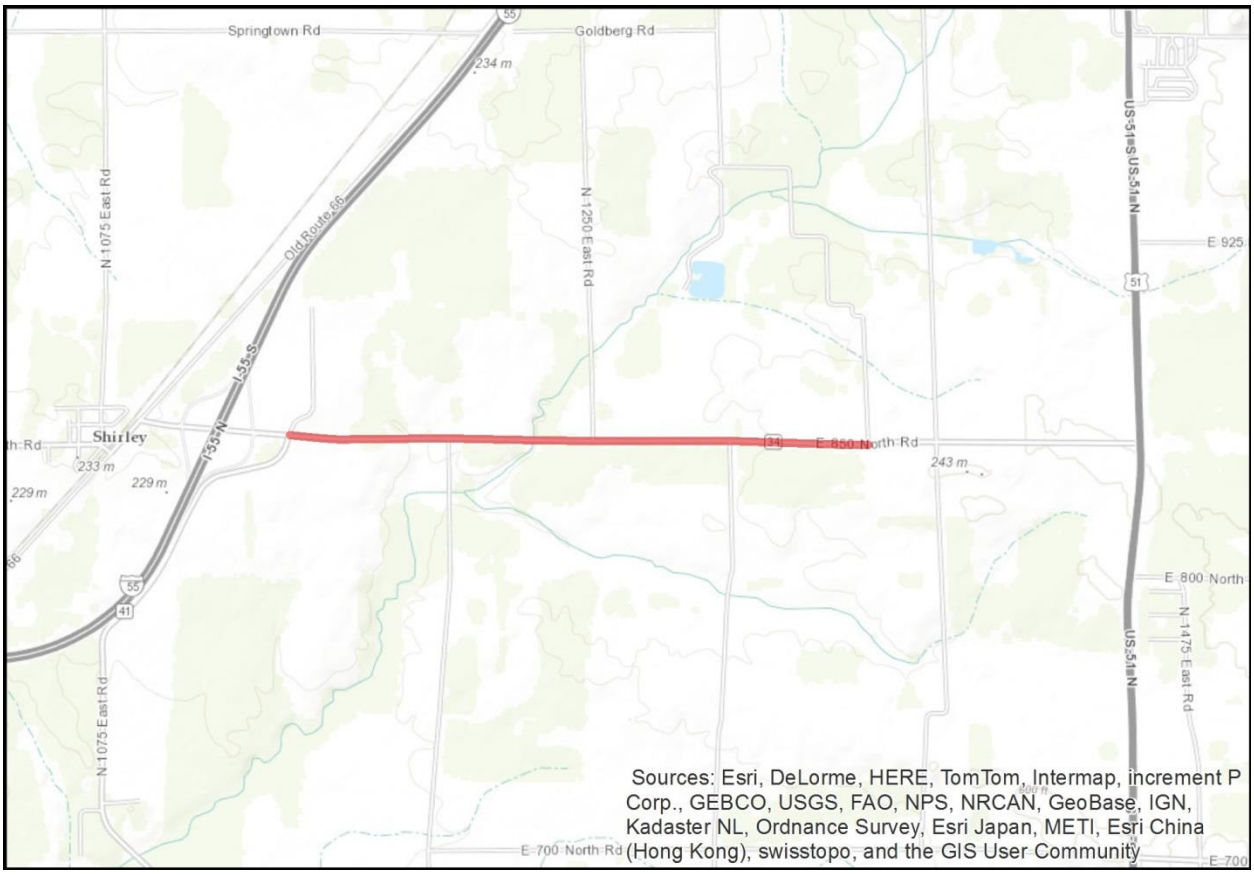

Figure 18. Shirley Road Location

Existing Conditions

This project is generally located south of Bloomington and east of Shirley in southwest McLean County. Shirley Road (CH 34), a quarter mile east of I-55 to 1350 East Road, is classified as a rural major collector. It consists of oil and chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 475 vehicles per day. No roadway lighting is present within the project limits.

Scope of Improvements

The Shirley Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders. The 2.0 mile long project would be expected to cost around $2.5 million in 2016 construction dollars.

Stakeholder Consideration

Shirley Road was not mentioned specifically in any stakeholder involvement interviews.

Benefit-Cost Ratio

Shirley Road has a benefit-cost ratio of 12.84 if rebuilt in 2024.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.36 to 0.25 and the annual expected property damage crash frequency decreasing from 0.76 to 0.73. This equates to a societal savings of $3,300 annually and $348,000 over the life cycle.

Adverse Travel

The closure of Shirley Road results in an annual increase of 557,000 miles and 10,100 hours, the closed road would cost society $565,000 annually and $36,677,000 over the 50 year life cycle.

Shirley Road Bridge (Timber Creek Bridge)

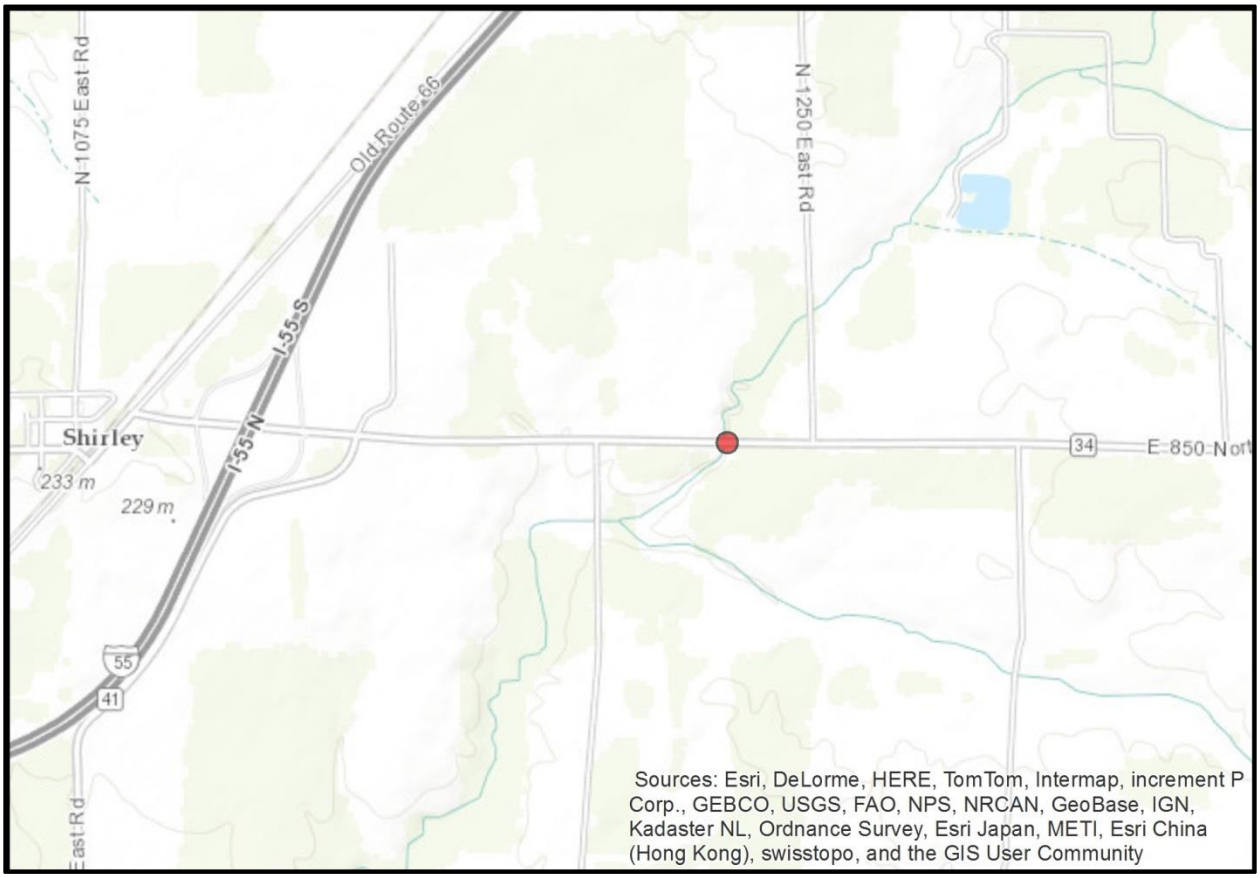

Figure 19. Shirley Road Bridge Location

Existing Conditions

Shirley Road Bridge (also known as Timber Creek Bridge) is a three-span, concrete slab bridge built in 1962, located about 1.5 miles east of Shirley in southwest McLean County. The bridge crosses Timber Creek and carries Shirley Road (CH 34) within the Shirley Road project limits described above. The roadway surface is constructed of HMA, with two 10-foot lanes and 2-foot gravel shoulders, and it carries 500 vehicles per day. The bridge is about 60 feet long and has an average sufficiency rating.

Scope of Improvements

The Shirley Road Bridge project is anticipated to consist of a complete replacement. The bridge is currently included in the McLean County Highway Department 5-Year Plan (2015-2019), and the project is programmed for FY 2019 with an expected cost of approximately $675,000.

Stakeholder Involvement

Shirley Road Bridge was not specifically brought up in any stakeholder interviews.

Benefit-Cost Ratio

Shirley Road Bridge has a benefit-cost ratio of 111.2 if rebuilt in 2016.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 0.0007 to 0.0006 and the annual expected property damage crash frequency decreasing from 0.0015 to 0.0013. This equates to a societal savings of $22.73 annually and $3,470 over the life cycle.

Adverse Travel

The closure of the Shirley Road Bridge results in an annual increase of 556,000 miles and 10,500 hours, the closed road would cost society approximately $591,000 annually and $50,022,000 over the 50 year life cycle.

Stringtown Road

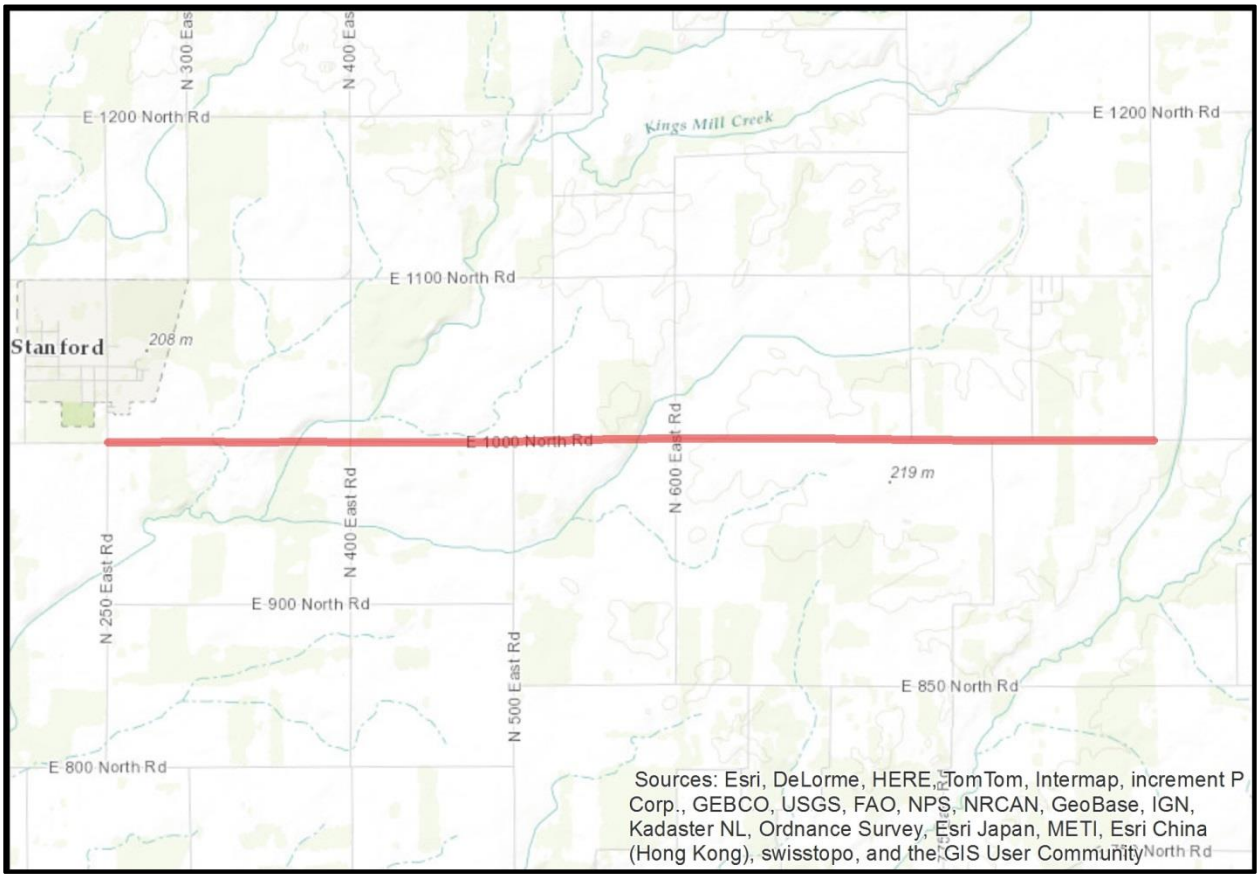

Figure 20. Stringtown Road Location

Existing Conditions

This project generally extends eastward from Stanford in west McLean County. Stringtown Road (CH 32), from CH 59 to CH 43, is classified as a rural major collector. It consists of a HMA surface with two 11-foot travel lanes, 4-foot gravel shoulders, and carries 1,050 vehicles per day. No roadway lighting is present within the project limits. The intersection with CH 59 is free flow for the north-south movements and stop-controlled for the east-west movements. The intersection with CH 43 is free flow for the east-west movements and stop-controlled for the southbound movement.

Scope of Improvements

The Stringtown Road project is anticipated to consist of resurfacing with HMA. The purpose of the project is to increase the allowable weight limit to 80,000 pounds. The improvement will not widen the roadway or the shoulders. The 6.5 mile long project would be expected to cost around $2.2 million in 2016 construction dollars

Stakeholder Consideration

The railroad overpass on Stringtown Road was mentioned by the McLean County Emergency Telephone Systems Board as an improvement that could reduce response time and improve the safety

of the responders. This underpass is on the far east end of the road, near I-55 and would not be included in the proposed project.

Benefit-Cost Ratio

Stringtown Road has a benefit-cost ratio of 15.0 if rebuilt in 2029.

Safety

Because the purpose of this improvement is to increase the structural capabilities of the road, the improvements will not have a significant effect on the expected crash frequency. The fatal and injury crash rate is expected to remain at 1.0 crashes per year and the property damage only (PDO) crash rate is expected to remain at 2.1 crashes per year.

Adverse Travel

The closure of Stringtown Road results in an annual increase of 882,000 miles and 16,000 hours, the closed road would cost society approximately $1,221,000 annually and $66,022,000 over the 50 year life cycle.

Thomas Craft Road

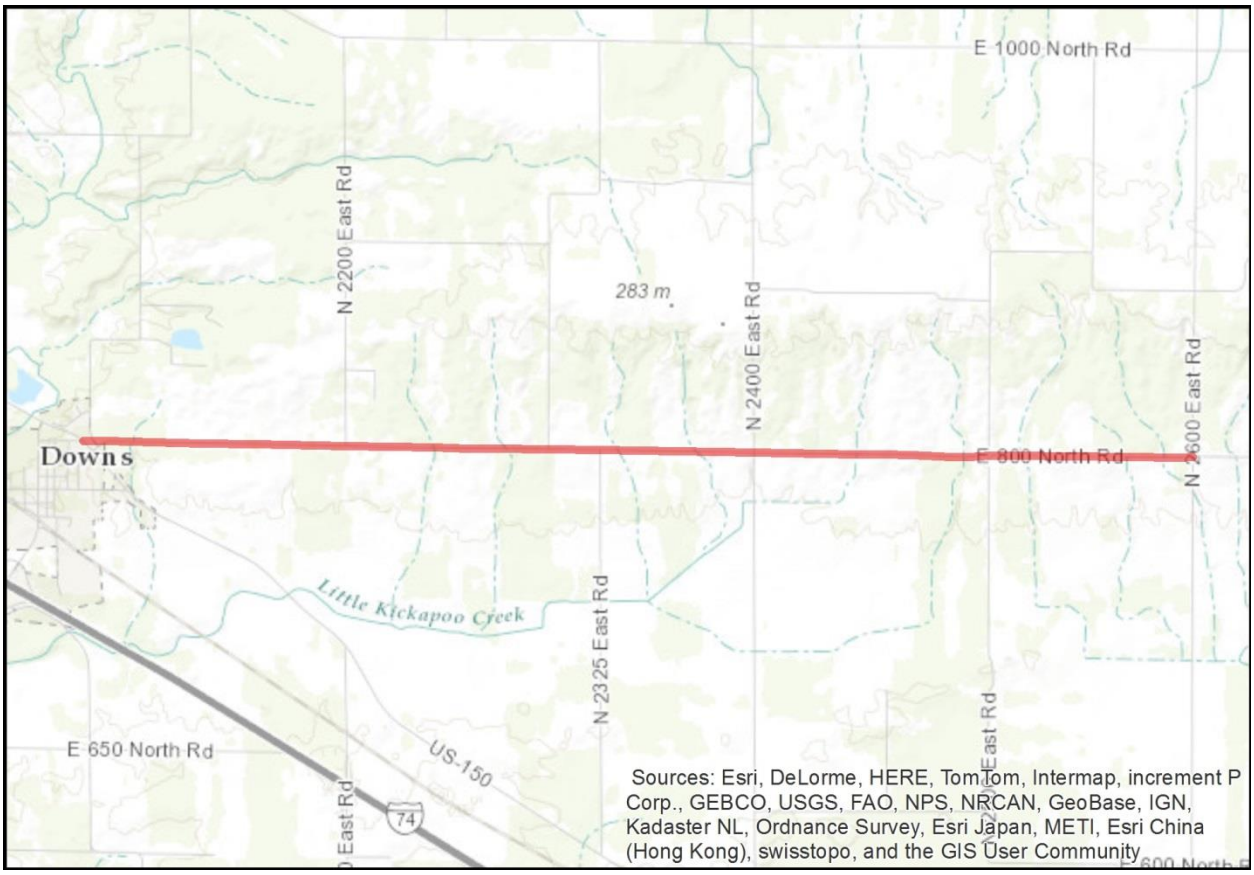

Figure 21. Thomas Craft Road Location

Existing Conditions

This project generally extends eastward from Downs in central McLean County. Thomas Craft Road (CH 36), from US 150 to CH 21, is classified as a rural major collector. It consists of an oil & chip surface with two 10-foot travel lanes, 2-foot gravel shoulders, and carries 750 vehicles per day. No roadway lighting is present within the project limits. The intersection with US 150 is free flow for the north-south movements and stop-controlled for the east-leg. The intersection with CH 21 is free flow for the east-west movements and stop-controlled for the north and south movements.

Scope of Improvements

The Thomas Craft Road project is anticipated to consist of reconstructing the roadway, converting it to HMA with 11-foot travel lanes and 4-foot gravel shoulders with a flattened vertical alignment. The 5.25 mile long project would be expected to cost around $7.875 million in 2016 construction dollars

Stakeholder Consideration

Thomas Craft Road was mentioned by the McLean County Emergency Telephone Systems Board stating that CH 36 being closed would increase Emergency Medical Services (EMS) response time.

Benefit-Cost Ratio

Thomas Craft Road has a benefit-cost ratio of 8.5 if rebuilt in 2023.

Safety

The safety analysis predicts that the proposed improvement will result in the annual expected fatal or injury crash frequency decreasing from 1.329 to 1.052 and the annual expected property damage crash frequency decreasing from 2.730 to 2.161. This equates to a societal savings of $57,390.96 annually and $6,016,000 over the life cycle.

Adverse Travel

The closure of Thomas Craft Road results in an annual increase of 1,227,000 miles and 22,300 hours, the closed road would cost society approximately $1,244,000 annually and $80,682,000 over the 50 year life cycle.

Summary of Benefit-Cost Ratio Results

Table 2 shows the twenty projects ranked by benefit-cost ratio.

Table 2. Benefit-Cost Ratio of McLean County Projects

All McLean County Projects	
Project	**BC Ratio**
Lexington East Road Bridge	122.8
Gillum Road Bridge	117.8
Shirley Road Bridge	111.2
Ron Smith Bridge	110.2
Gridley Road Bridge	98.0
Cropsey Road	69.5
Danvers-Yuton Road	35.7
Horse Farm Road	34.7
Gillum Road	27.4
Hudson West	26.3
Gridley Road	26.0
Ridde Pit Road Bridge	24.3
Stringtown Road	15.0
Old Colonial Road	14.7
Colfax Road	14.1
Mansfield Road	12.3
Ireland Grove Road	11.7
Shirley Road	11.0
Thomas Craft Road	8.5
Meadows Road	4.1

The benefit-cost ratio is not an indication of exactly where funding should be prioritized in the upcoming years; rather it is an indication of how valuable the proposed improvement is when the project becomes necessary. For example, if a bridge that has a lower benefit-cost ratio than another, but is in a higher danger of failing, the lower benefit-cost ratio bridge can be prioritized ahead of the higher benefit-cost ratio bridge. The rearranging works as long as funding will be available when the higher benefit-cost ratio bridge will need reconstruction.

Funding Options

The benefit-cost ratio should serve as a guideline for choosing important projects for the County. However, that does not necessarily indicate that the highest ranked project must be improved before a lower ranked project. If funding assistance is available for a specific project and not another, the County may want to pursue the funding opportunity, as it could significantly decrease to the local project cost.

Traditional Funding

Traditional funding options for McLean County include:

- McLean County Highway Department General Funds
- Bonding
- Motor Fuel Taxes (MFT)
- Surface Transportation Urban (STU)
- Surface Transportation Rural (STR)
- Major Bridge Funds
- Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant
- Highway Safety Improvement Project (HSIP)

Each funding option may be available for several different projects. To assist the County in prioritizing projects for different funding mechanisms, the projects have been sorted by funding opportunity.

McLean County General Funds

The McLean County Board has the ability to allocate a portion of the collected county taxes for infrastructure improvements. The County Board can choose to spend these funds on any project or as the local match portion of projects using other funding opportunities. In order for more funds to be available, the Board would have to change the way funds are currently appropriated.

Bonding

The County Board has the option to sell bonds to pay for a project. Revenue from selling bonds could be available for use on any project. Funds to service the bond debts could be raised through policy changes that would increase revenue in the form of increased or new user fees or other alternative funding paths.

Motor Fuel Taxes (MFT)

McLean County is provided a representative portion of the collected state MFT each year. The County can choose to spend these funds on any project listed in this study or use the funds as the local match portion of projects using other funding opportunities.

Surface Transportation Urban (STU)

Federal money for urban roadways is distributed to the local governments represented within a Metropolitan Planning Organization (MPO). McLean County is a member of the McLean County Regional Planning Commission which awards funds to projects within the urbanized area. Very few County Highways are within the urbanized area. White Oak Road (CH 70) and Towanda Barnes Road (CH 29) are the major county highways that are in the urbanized area.

Surface Transportation Rural (STR)

STR is federal money that is allotted to counties on an annual basis. Projects must be outside the urbanized area to be eligible. All the projects in this study are outside the urbanized areas, and therefore eligible for STR funding.

Highway Bridge Program (HBP) Funds

The Highway Bridge Program (HBP) provides federal funds for bridges that are structurally deficient and/or functionally obsolete, have a sufficiency rating of 50 or less, and are located on a public road. No bridges prioritized in this project currently have a sufficiency rating less than 50.

Illinois Major Bridge Program

IDOT dedicates 20% of its HBP fund for a Major Bridge Improvement Program. Projects eligible for the Major Bridge Program must have a total project cost of more than $1 million. Several of the bridge projects are expected to cost over $1 million, but none of the bridges currently have a sufficiency rating less than 50.

Transportation Investment Generating Economic Recovery (TIGER) Discretionary Grant

TIGER is a federal grant program that is competitively awarded. The minimum project award amounts that apply for TIGER grants are $10 million for urban projects and $1 million for rural projects. Rural projects are defined by "outside the urbanized area." Most of the projects in the study are outside of the urbanized area and cost more than $1 million. Projects that qualify for TIGER funds are shown in Table 3.

Table 3. Projects Eligible for TIGER Funding

Project	BC Ratio
Gillum Road Bridge	117.8
Ron Smith Bridge	110.2
Gridley Road Bridge	98.0
Danvers-Yuton Road	35.7
Horse Farm Road	34.7
Gillum Road	27.4
Hudson West	26.3
Gridley Road	26.0
Stringtown	15.0
Old Colonial Road	14.7
Colfax Road	14.1
Mansfield Road	12.3
Ireland Grove Road	11.7
Shirley Road	11.0
Thomas Craft Road	8.5
Meadows Road	4.1

Highway Safety Improvement Program (HSIP)

HSIP is federal money that is awarded competitively throughout the state based on the benefit-cost ratio for the proposed safety improvements. The proposed projects' safety benefit-cost ratios have not been calculated, but the benefit of safety improvements have been calculated and can be used when applying for HSIP grants. There were no major crash problems identified during the analysis.

Illinois Commerce Commission (ICC) Grade Crossing Protection Funds

ICC grade crossing protection funds are available to projects improving at-grade or grade-separated rail crossings. Danvers-Yuton Road is the only project discussed in this report that crosses an active railroad; these funds could be used to improve the existing at-grade crossing if train traffic were to increase.

Non-traditional Options

With most competitively won state and federal funding options, a local agency match is typically required. The match must come from the agencies' locally generated revenues, the state MFT allocation, or privately held funds. The local match typically varies between 10% and 40% of the total project cost. In order to afford the completion of large projects and/or as many projects as possible, McLean County could develop non-traditional sources of funding such as wheel taxes, local gas or sales taxes, infrastructure banks, public/private partnerships, and transportation impact fees.

Reducing Long Term Financial Liability

Oil and Chip Pavements

Hot-Mix Asphalt (HMA) pavements are significantly more expensive to construct and maintain than oil and chip pavements. Oil and chip surfaces do not supply any more structural benefit than a gravel road, however they do withstand the elements better and provide smoother riding surfaces than gravel roadways. Although oil and chip surfaces need to be resurfaced every 5 to 6 years while HMA pavements generally need resurfaced every 20 years, over a 50 year life cycle, maintaining HMA surfaces can cost more than 4 times the amount oil and chip surfaces. As long as the traffic volumes, especially truck volumes, are low enough that the oil and chip surface can withstand the volume for a few years without failing, there is rarely an economic reason to build HMA pavements in a rural area. However, if the route needs to withstand regular heavy truck roads or designated as a rural arterial roadway, the increased structure and improved riding surface provided by an HMA pavement is required. Additionally, oil and chip roadways maybe viewed as subpar by some constituents. Policy decisions need to be made regarding the level of service the roadways need to provide based on what level of service the tax payers are willing to fund.

Jurisdictional Transfer or Vacating Right of Way

It can be expensive to maintain roadways or bridges that are no longer useful to the community. When projects have low benefit-cost ratios, the County could consider jurisdictionally transferring the property to a township.. This would allow the roadways to be held to different standards than the county highways. Additionally, for bridges, this would allow them to be eligible for the Township Bridge Program. With the Township having control over the roadway, the local community can determine the appropriate way to handle the network. If the roadway would not be critical to the township network, the right of way could be vacated and returned to the adjacent property owners. Some right-of-way (ROW) could become productive farm ground, for example.

For McLean County, all the proposed projects have a benefit-cost ratio above 1.0 indicating that the roadway is important to the network and the enhanced mobility though the county is worth the investment in the infrastructure. However, if funding becomes even tighter, roads with low benefit-cost ratios and redundant routes, such as Meadows Road could be considered for jurisdictional transfer.

Recommendations

Using the collected data and methodologies in the appendix, the recommendations are as follows:

- Resurfacing Cropsey Road with oil and chip is more economical than maintaining hot-mix asphalt (HMA) pavement since the traffic volumes do not require the increased structural capacity of the HMA pavement.

  As discussed in the funding options, HMA pavements are expensive to construct and maintain when compared to oil and chip roadways. Cropsey Road is an instance where reconstructing the HMA pavement may not be necessary for the volumes, and therefore it is recommended that the county spend its limited resources on other projects.

- The most beneficial bridges to the network are Gillum Road Bridge, Shirley Road Bridge, and Ron Smith Bridge. These bridges should be a top priority for the county when they become in danger of closing.

  As described in the methodology, there is not an accepted degradation schedule for bridges based on sufficiency rating. All the bridge benefit-cost ratios were calculated as if the bridge were reconstructed in 2016. Therefore, the benefit-cost ratio is not an indication of which bridge should be reconstructed first, it is an indication of which bridges should be planned and saved for. The three bridges listed above should not be deferred for other bridge or roadway projects. When they require reconstruction, they should be a top priority. However, since none of the bridges in the study have existing crash problems, reconstructing the bridges while they still have useful life is not recommended.

- The poor pavement on Meadows Road should only be reconstructed if it doesn't defer any other roadway projects.

  Although Meadows Road has the one of the worst pavement conditions in the system, the roadway has alternate routes and low ADT. Reconstructing the road to HMA pavement should not be a high priority for the county, especially if it would require other projects to be postponed or not completed.

- Danvers-Yuton Road and Horse Farm Road should both be high priorities for McLean County

  Resurfacing Danves-Yuton or rebuilding Horse Farm Road would be good investments for the county.

Flexibility of Prioritization Process

The analyses herein establish a process that can be recreated by any jurisdiction to prioritize potential improvements. By combining the use of hard data and subjective knowledge, the process can assist in determining which projects are the most beneficial for a jurisdiction. The data required to compile the benefit-cost ratios included:

- Historic Crashes and/or Roadway Characteristics,
- Increase in VMT and VHT for road closure,
- Pavement Condition Indexes or Structural Sufficiency Ratings,
- Cost of Improvement, and
- Stakeholder Opinion.

If this data is available, the methodologies described in this study may be used to determine priorities.

Appendix A: Benefit of Safety Methodology

Expected Crash Frequency

Two (2) methodologies are typically used to predict crashes:

1. A historic crash frequency could be assumed to directly predict crashes in the future.
2. Site characteristics can be used to predict the number of crashes based on crash rates at sites with similar characteristics.

The Highway Safety Manual (HSM) uses the Empirical Bayes (EB) Method to balance the two theories to create a more accurate estimation of expected crashes. Crashes are considered random events, so using only historical data could make a location seem like a high crash area when it is just coincidence that the crash occurrence is high. But, only focusing on quantifiable roadway characteristics could miss a qualitative aspect of the location that is causing an unusually high number of crashes. The EB Method should counteract both biases. The HSM gives guidance on how to follow the procedure, but for this study, an Illinois Department of Transportation (IDOT) spreadsheet specifically designed for implementing the 2010 HSM methodologies was used. The spreadsheet requires inputs of roadway characteristics and historic crash frequencies, then returns expected crash frequencies.

Crash Modification Factors

After an expected crash frequency is found, Crash Modification Factors (CMF's) can be applied. A CMF is a percentage of crashes that will remain at a location if a change is made to the roadway. For example, if a four-lane road undergoes conversion to a through lane in each direction with a two-way-left-turn lane, 71% of the crashes along the segment will remain (i.e. CMF equals 0.71). A CMF is not always less than one. If a change to the roadway will increase crashes, the CMF would be greater than 1. For example, changing from a two-way stop-control intersection to a signalized intersection could increase the number of rear-end crashes at the location, so the CMF for rear-end crashes for that improvement would be greater than one.

CMF's can be found in the HSM or an online CMF clearinghouse. For a few individual cases, a CMF could not be found for a proposed improvement. For example, there is no CMF associated with changing the roadside from shoulders and ditches to curb and gutter. In this and similar instances, no CMF was applied. In situations where the CMF would only apply to a section of the project, the CMF was only used to reduce the expected crashes at the specific location. For example, if a roadway improvement included multiple intersections, but a left turn lane was only added to one intersection, the CMF would only be applied to reduce the expected crashes at that intersection.

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Appendix B: Adverse Travel Methodology

When a road or bridge is closed, adverse travel is experienced by the user. Costs are associated with the added distance and time it takes to detour around the closed segment of the network. However, it is incorrect to claim the benefit of keeping a road open in 2015 if the road is expected to stay open without improvements until 2025. To determine the timeframe until closure for the individual projects, two different techniques were used.

For roadways, pavement condition indexes (PCI) and a life cycle curve were used to predict how many years were left until the road would be unusable. For bridges, there is no life cycle curve that will indicate when the bridge will require closure, based on sufficiency rating, for example. Therefore, it was assumed that the bridge would fail in year zero. The resultant benefit-cost ratio does not indicate that the bridge should be rebuilt this year. Instead, it shows the benefit of rebuilding a bridge before it fails. In other words, it is a demonstration of how risk adverse the county should be about the possibility of a bridge closing if the sufficiency rating is low.

Bridges and roads can still be compared to each other. If a bridge has a higher benefit-cost ratio than a road that is expected to require reconstruction in 5 years, the County should interpret the results to mean that it is more important to the traveling public that the bridge remain open than it is for the roadway to be reconstructed when it fails.

Length of Adverse Travel

For our analysis, the assumption was made that a vehicle that would normally use the closed roadway would use the surrounding roadways to arrive on the closed roadway on the other side of the closure. Figure 1 shows the detour route that was assumed for passenger vehicles and heavy vehicles. For passenger vehicles, any township road is available to use. When heavy vehicles need to be detoured, the options become more limited because they are limited to truck routes. If a road is incapable of carrying the 80,000 pound load, the roadway is posted for a lower weight limit. The McLean County Highway map outlining county highways that are posted for lower weight limits was used to determine the most efficient and legal detour for heavy vehicles. The figure shows 2.0 miles of Colfax Road closed in red. The blue route is the fastest route for passenger vehicles using the township roads and the green route is the fastest route for heavy vehicles using the county highway system.

The adverse travel was calculated by finding the difference between the length of the trip when Colfax Road is open and the length of the trip to arrive at the same destination when Colfax Road is closed. These lengths were multiplied by the ADT and an assumed truck percentage of 5%. Travel times were also calculated based on 55 mph on the county highway systems and 70 mph and 65 mph for passenger vehicles and heavy vehicles, respectively, if the interstate was the shortest detour.

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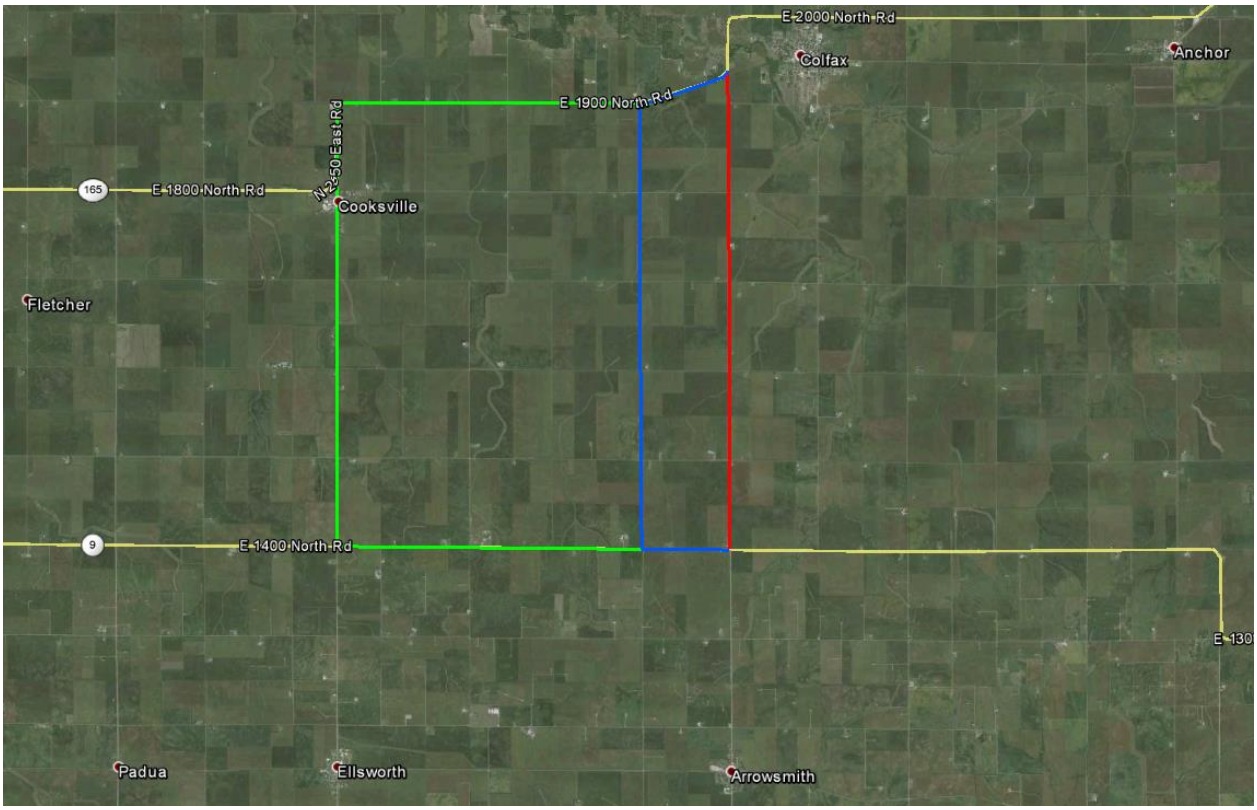

Figure 1. Example Adverse Travel Calculation (Colfax Road)

Costs of Adverse Travel

In order to compare the benefit of avoiding adverse travel to the cost of a project, dollar amounts must be associated with the added travel time and distance caused by closing a road or bridge. The users of the transportation system experience costs for every mile and every hour they spend traveling, including:

- Loss of productive time
- Added vehicle expenses
- Added emissions

It is unfair to claim the benefit of keeping a road open in 2015 if the road will stay open without improvements until 2024. To determine the time frame until closure for the individual projects, two different techniques were used.

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Loss of Productive Time

The United States Department of Transportation (USDOT) estimates the cost of lost productive time to be $15 per hour for a passenger vehicle and $50 per hour for trucks. A regional average for truck traffic as a percent of total traffic is five percent. These factors were applied to the increases in VHT that each roadway or bridge closure creates.

Added Vehicle Expenses

For every mile that is driven, vehicle value depreciates, more maintenance is required, and more gasoline is consumed. The added VMT to the system from each project closure was multiplied by the AAA reimbursement rate of $0.565 per mile.

Added Emissions

To account for the emissions added to the atmosphere, the USDOT rate of 0.000025 tons of Volatile Organic Compounds (VOC) per hour at an expense of $1813 per ton and 0.000005 tons of Nitrogen Oxide (NOx) per hour at an expense of $7,147 per ton for added delay for the system.

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Appendix C: Cost Methodology

Costs of Improvement

The cost applied was the opinion of probable cost to construct each improvement in 2015 provided by the McLean County Engineer. For some projects, the amount the county must pay will be a fraction of the total cost, because they will be supplemented with state or federal funds. However, for the purpose of benefit-cost ratio calculation, the total cost was used to represent the benefit to the constituents, since state and federal money is also provided by tax payers.

Salvage Value

Another consideration for project cost is design life. Roadways are designed to last between 20 and 40 years, depending on maintenance practices. Bridges are designed to last around 75 years. It is feasible that a road could need to be rebuilt three times by the time a bridge built at the same time fails. A life cycle of 50 years was used to account for this disparity. Bridges were assumed to last 75 years and roads were assumed to last 27 years.

An example of how salvage value is calculated for a bridge is shown below:

- 2015: A bridge is built
- 2016: the bridge is opened
- 2065 (the end of the life cycle): the bridge has 26 years out of the 75 year design life remaining
- 35% of the construction cost is salvaged

In the bridge scenario, the construction cost only occurred once, and the salvage value is a significant percentage.

An example of how salvage value is calculated for a road is shown below:

- 2015: A road is built
- 2016: the road opens
- 2043: the road needs to be rebuilt
- 2044: the road reopens
- 2065 (the end of the life cycle): the road has 6 years out of the 27 year design life remaining
- 22% of the construction cost is salvaged

In the road scenario, the construction cost occurred twice and the salvage value is a smaller portion of the investment.

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Appendix D: Public Meeting Materials

In the following pages are:

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Appendix

Appendix A: Benefit of Safety Methodology

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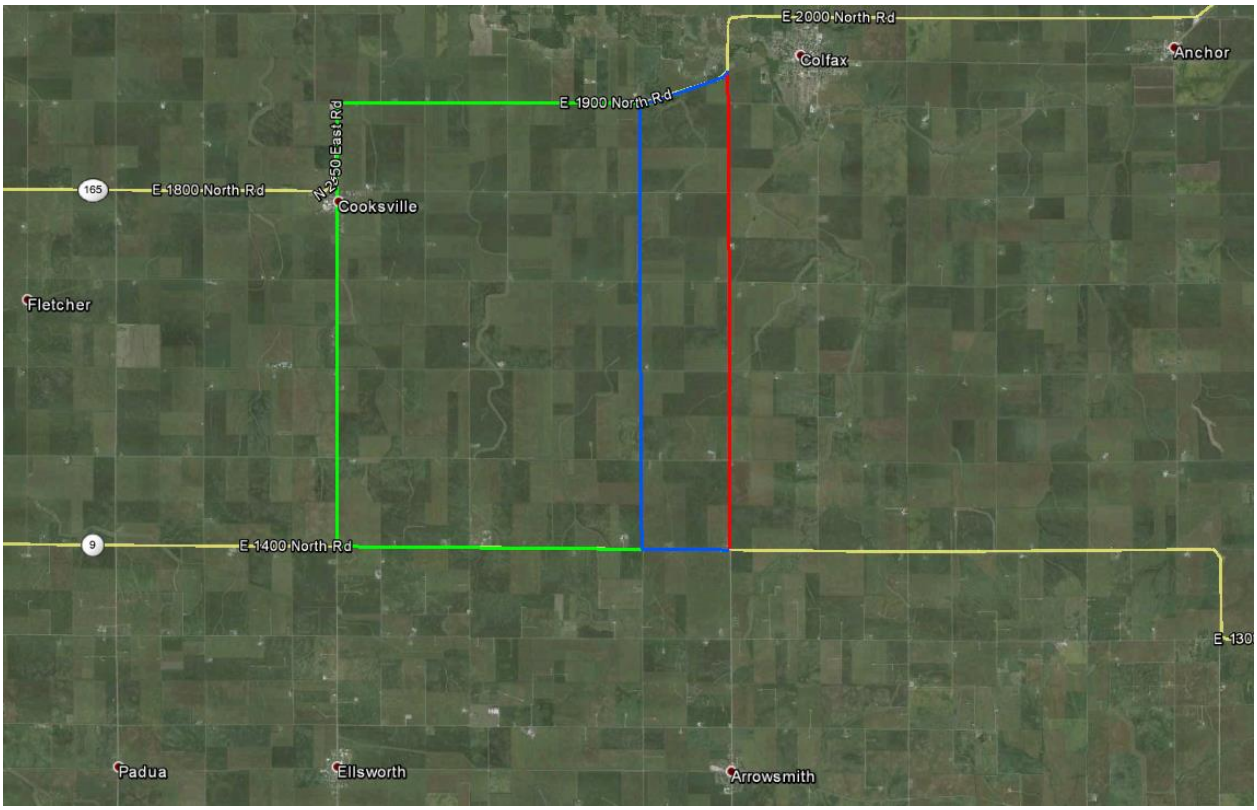

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